DIESEL PROGRESS

J·U·L·Y 1·9·4·2

IN INDUSTRY · IN TRANSPORTATION · ON THE SEA · IN THE AIR

"Piston ring wear has been very slight...tool marks still visible on compression rings below the top two...ring grooves in pistons still have original dimensions.

"Extremely small cylinder wear is remarkable, as average wear over period of 22,000 hrs. is only .00025" per 1000 hrs. operation!"

Supt. A. Lee Bland further reports "oil consumption at minimum" in this 8-cyl., 800-hp. Chicago Pneumatic Diesel. It has been lubricated with *Texaco Ursa Oil* from the start.

SO runs the report from Supt. A. Lee Bland, on the remarkable freedom from ring, groove, and liner wear in this 800-hp. Chicago Pneumatic Diesel at Blackstone, Va.

Since installation in 1937, this Diesel has been lubricated exclusively with *Texaco Ursa Oil.*

Highly resistant to the formation of gum, sludge and hard carbon, *Texaco Algol and Ursa Oils* keep piston rings free, valves clean, ports open. Result:

More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

The outstanding performance that has made Texaco first in the stationary Diesel field has made it first in the fields listed in the panel.

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★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

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★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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TEXACO

TEXACO Lubricants and Fuels

FOR ALL DIESEL ENGINES

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

DIESEL PROGRESS for July, 1942. Volume VIII, Number 7. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: $5.00 per year, single copy, 50c.

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DIESEL and GAS ENGINE PROGRESS

REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: Commemorating Independence Day. New York Herald Tribune Photo.

TABLE OF CONTENTS ILLUSTRATION: A twin-six General Motors Diesel engine for military vehicles as exhibited in the "Arms for Victory" show in Dayton, Ohio, by six General Motors Divisions. Left to right: E. G. Biechler, general manager, GM Frigidaire Division, Dayton; Charles R. Hook, president, American Rolling Mill Company, Middletown, Ohio; William C. Williams, Jr., vice-president of General Motors, Detroit.

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HEYWORTH CAMPBELL
Art Director

JULY CONTENTS

THE Syracuse, New York, airport—which long has played the role of good Samaritan to pilots who ride the skyways—recently added another laurel to its wreath of service.

This airport, famous for its continuity of electrical power despite weather conditions, not only balked still another display of the elements on its home grounds, but strayed several miles afield to carry on the good work for a two-hour emergency period.

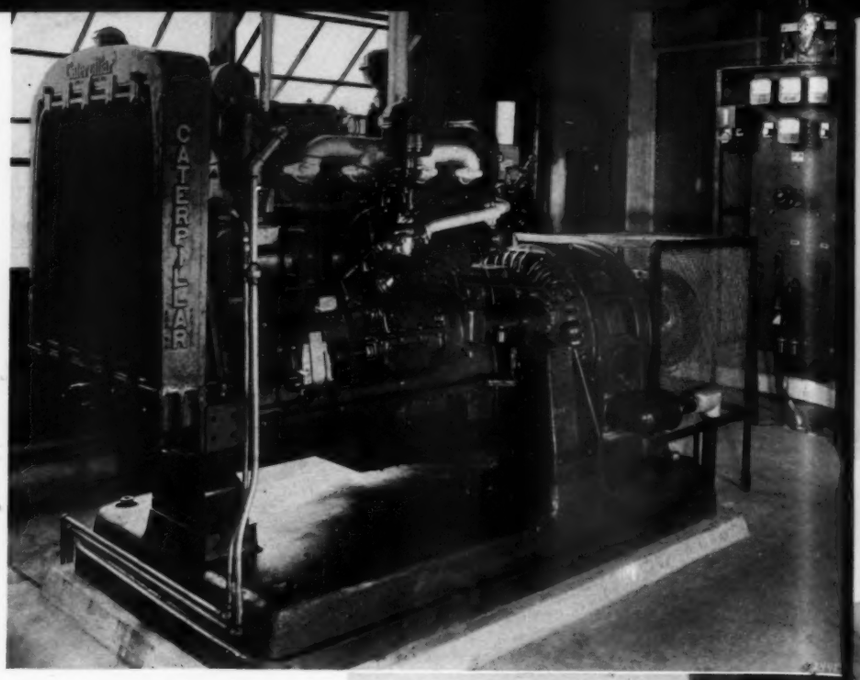
Back in 1938, the city-owned Syracuse airport installed a Caterpillar Diesel engine, direct connected to a 40 kw., 60 cycle, 440-volt, 3-phase generator, for standby power. The airport's entire communication apparatus is hooked to the same circuits which accommodate the boundary, flood, and runway lights. The engine may be started at dusk each day and operated at high idle until dawn; started and stopped in accordance with daily flight schedules now in vogue due to wartime regulations; or started during the day at the approach of a storm, or for other emergencies.

When power failures occur, the transfer to the standby source is so rapid that operators on duty aren't even aware that only their sturdy Diesel stands between them and a dangerous blackout.

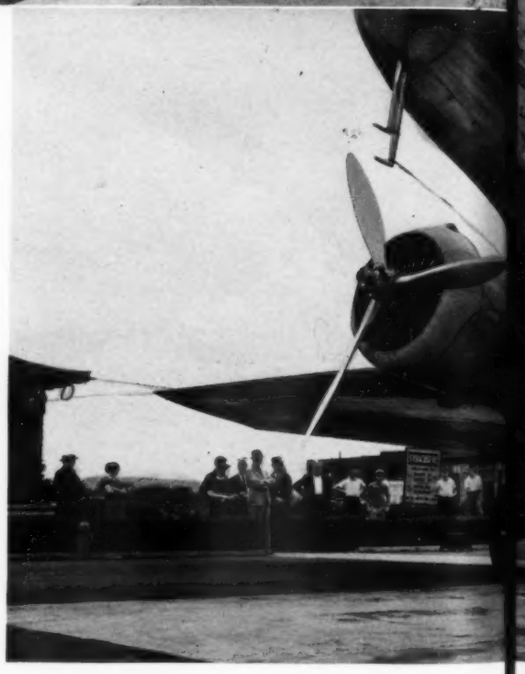
Not long ago, a vicious storm broke in the Syracuse area, causing a power failure. As usual the Diesel engine took over its duties at the port, as efficiently as ever.

Then came a request from the public utilities. It seemed that the folks at Amboy, a village some five miles away, were complaining about being cut off without electrical power. Inasmuch as it was feared that service could not be restored for several hours to these people, and those living between Amboy and the airport, a request was made for assistance from the Diesel. The engineer was asked to reclose the breaker between the standby plant and the high voltage transformers which normally supply the airport, which he did, thus restoring power all along the line from the point at which the break occurred.

No sooner said than done, as they say in the story books. Proper connections were made and in a short while the engine was supplying current for folks several miles away, as well as tending to its own particular job of "special nurse" to men with wings who often base their hopes for a "happy landing" on the steady dependability of the port's Caterpillar Diesel.



This Caterpillar Diesel, with direct connected G-E, 40 kw. generator, is used for emergency lighting, radio operation and other vital services at the Syracuse, N. Y., airport.

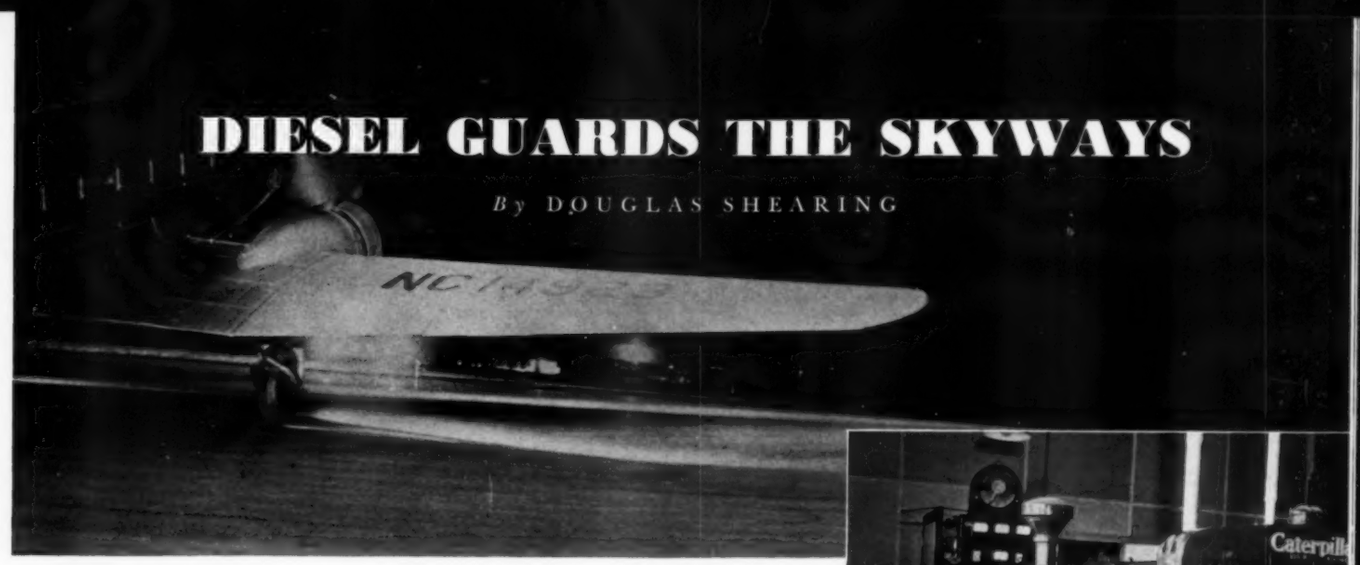


An American Airlines mail plane being prepared for takeoff at Syracuse.

General view of the Syracuse airport; office building, left, and hangar, right.

DIESEL GUARDS THE SKYWAYS

By DOUGLAS SHEARING



James E. Walsh, airport manager, says, "The Diesel is very dependable, easily started, and requires a minimum of attention."

E. J. Wood and E. B. Hale in the operation room at the Syracuse airport. All airport electrical services are dependent on Diesel-generated current in emergencies.

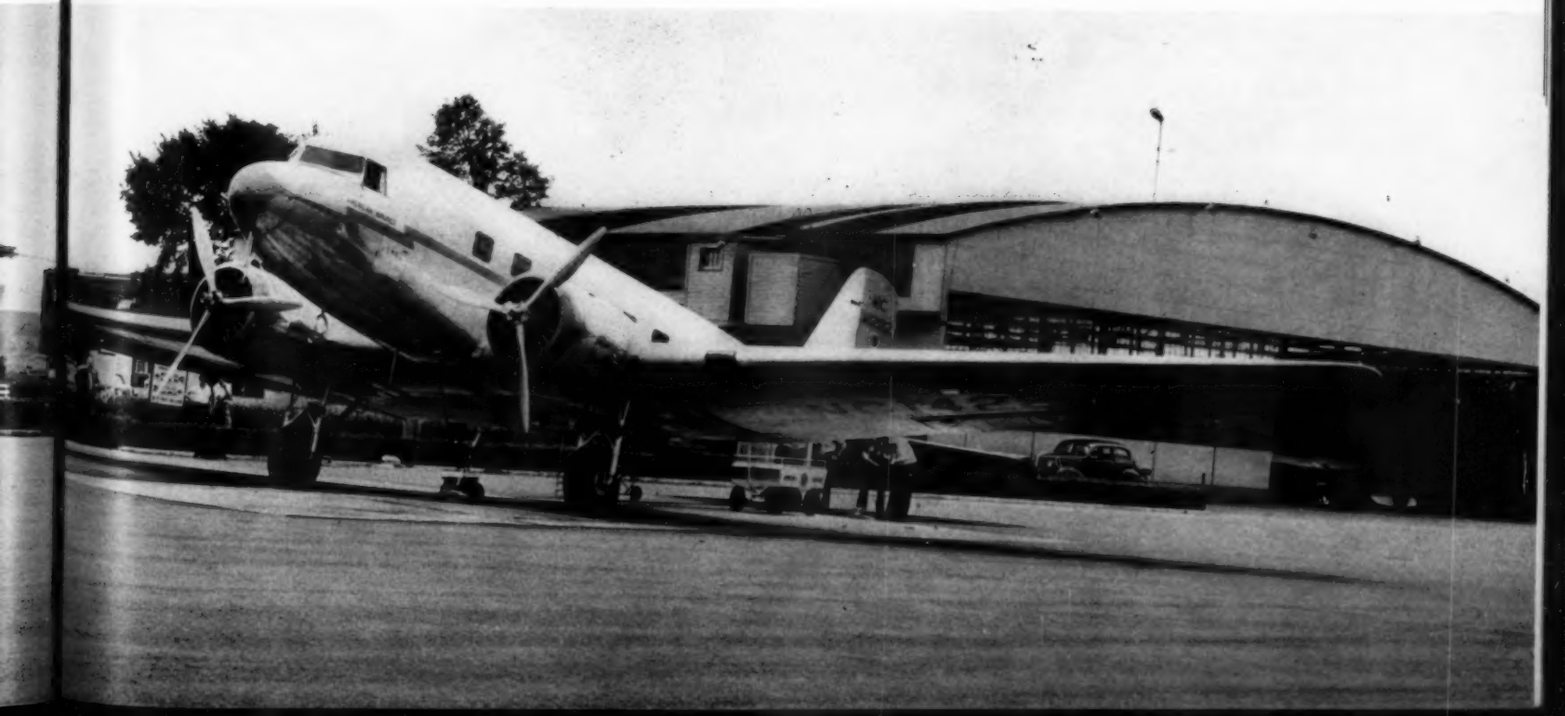


EXHIBIT "A" IN THE PASSING OF STEAM TUGS

By HENRY A. STEPHENS

ALTHOUGH a wealth of evidence has been presented showing the departure of steam power from the field of economical and efficient tugboat service, one would have to go far to eclipse the record achieved by the *Buchanan Sisters,* of the Bronx Towing Line fleet.

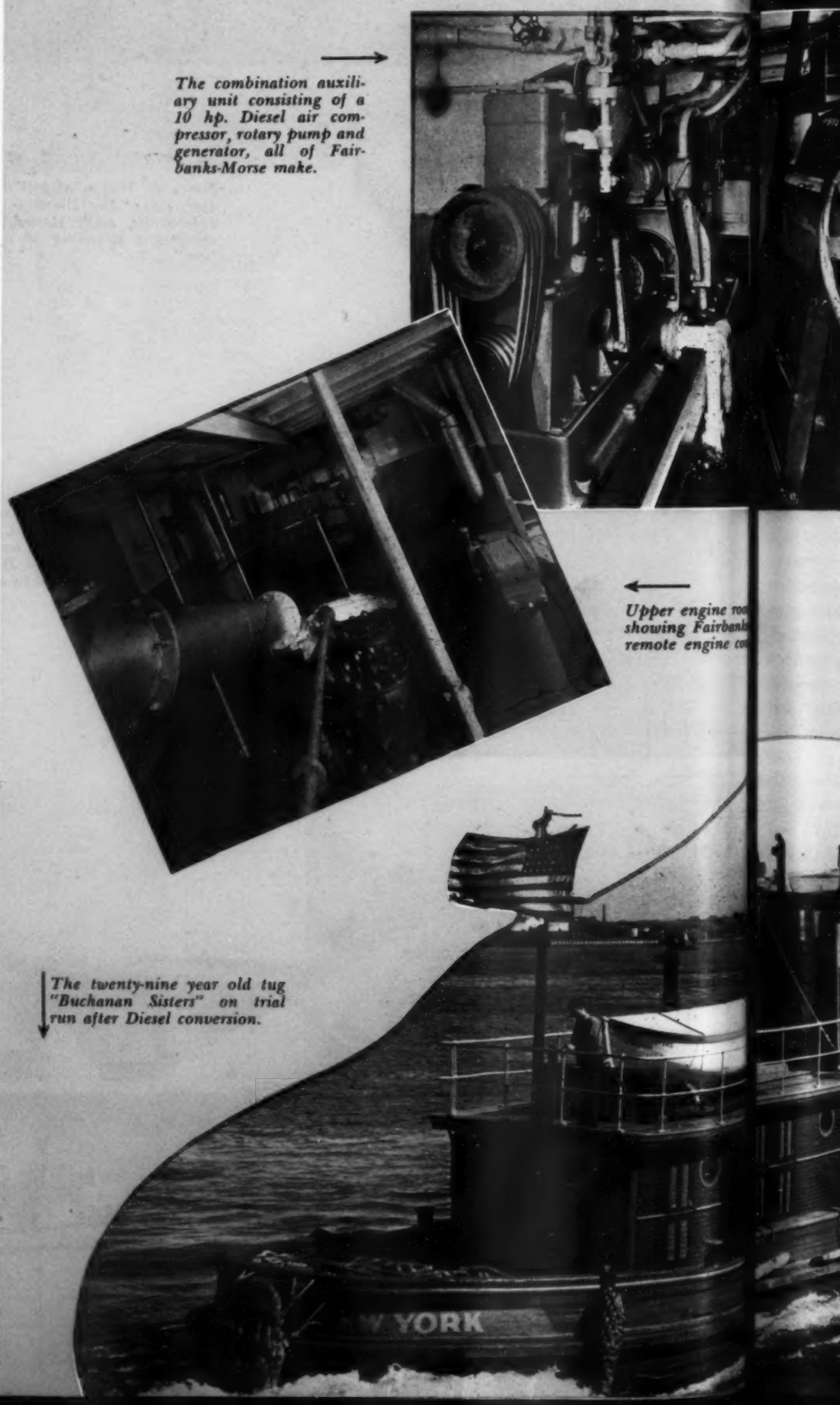
This sturdy vessel was built by her owners at their yards on the Harlem River in 1923. Of wood, with a 73 ft. length, 20 ft. beam and 9 ft. 8 in. loaded draft, she's constructed along staunch lines. For seventeen years, the *Buchanan Sisters* was steam powered and during that time her operating expense was a source of constant qualms to her owners.

On May 27, 1940, she was converted with a Fairbanks-Morse 450 hp. at 300 rpm., 6-cylinder, 14 in. bore x 17 in. stroke, marine Diesel engine. Now, two years later, the *Buchanan Sisters* has built up a record of savings, profits and efficient service that are close to unbelievable to those not acquainted with the expense and service differential of Diesel versus steam.

Originally founded in 1891 by the late David J. Conroy, the Bronx Towing Line is now headed by Terry Buchanan, a genial Irishman who went to work some twenty-eight years ago for Mr. Conroy as a fireman. Mr. Buchanan rose from that position to other capacities, secured his marine engineers' license and was chief engineer of the line for a decade.

The first tug upon which Mr. Conroy organized the company was a tiny vessel, the *Vigilant,* and they utilized a succession of tugs after that, emphasizing rugged construction, a necessity in their field. In 1921, the *Bronx No. 1* was built and two years later the *Bronx No. 2,* which is now the *Buchanan Sisters.* Although Mr. Conroy gave considerable thought to Dieselizing in his late years, there was a natural hesitancy to explore an unknown field. It is interesting to note that during this period the progressive Terry Buchanan consistently held out for Dieselization, although he frankly admits he was somewhat skeptical of putting a Diesel in a wooden hull, due to the question of vibration and possible leakage. Now he has no doubt, for the combination has proved highly successful.

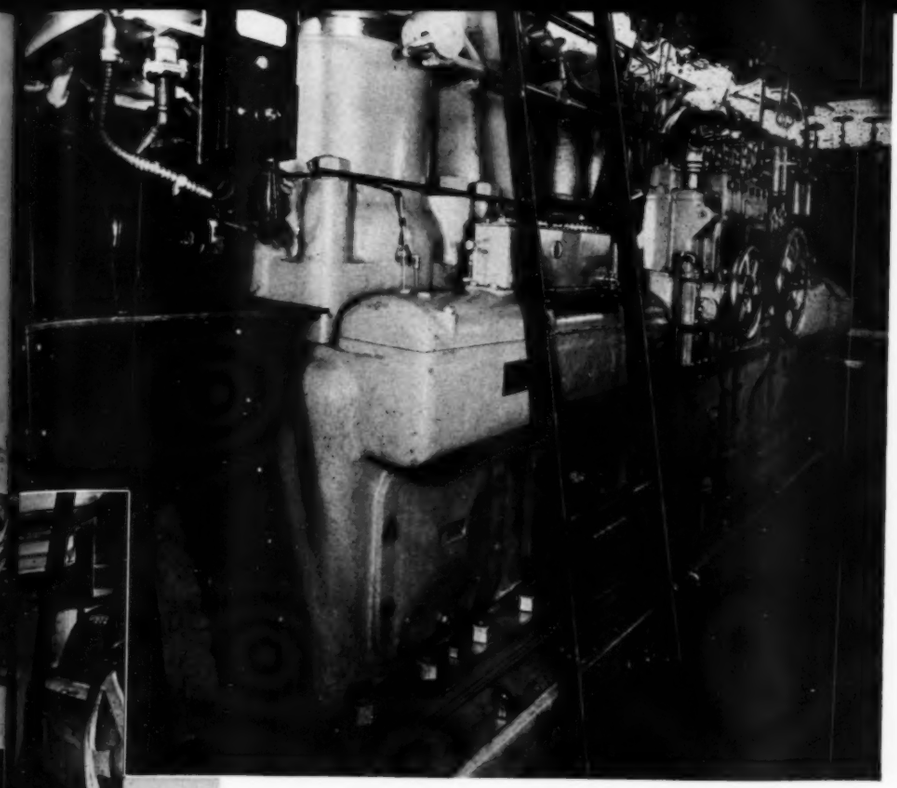
Before viewing the record compiled by the *Buchanan Sisters* as a marine Diesel tug, it might be well to take a quick look at her set-up when steam powered. First of all, though an extremely efficient steam vessel, the Bronz Towing Line only expected 25 to 26 days' service a month. In her trips, which consisted of haul-



The combination auxiliary unit consisting of a 10 hp. Diesel air compressor, rotary pump and generator, all of Fairbanks-Morse make.

Upper engine roo showing Fairbank remote engine co

The twenty-nine year old tug "Buchanan Sisters" on trial run after Diesel conversion.



Main propulsion engine on the "Buchanan Sisters" is this Fairbanks-Morse, 6 cylinder, 450 hp., 300 rpm. Diesel. Note Alnor multi-point pyrometer.

ing sand scows between Port Washington and points in the vicinity of the Gowanus Canal, it was necessary to figure one hour to one and a half hours out daily for water, and the tide, of great importance, was often lost. On every third day she had to coal up. This process, including the trip to the coaling station, required between two and three hours. It was figured out that there were only seventeen productive hours for the steam powered *Buchanan Sisters* out of every twenty-four. On the surface of this report, one would say "What did they expect?" True, this is quite a satisfactory steam record. Let us place it, however, against the present Diesel record of the *Buchanan Sisters* which consistently furnishes twenty-four productive hours out of a day.

Under steam power, coal was then between five dollars and five seventy-five a ton, and the basic operating expenses approached $1500 a month, to which could be added over three dollars a day for oil and grease, making an additional one hundred dollars a month. The operating expenses as far as personnel was concerned added another twenty per cent, as two firemen were needed. Using Standard #2 fuel oil and Socony DTE marine heavy medium lube oil, her complete Diesel operating expense never exceeds $450 a month. Both the fuel and lube oil guarantees of her F-M engines were considerably bettered. With a Fairbanks-Morse marine Diesel in the hold, the *Buchanan Sisters* has piled up a 100% efficiency record giving a full month of activity every month, twenty-four productive hours every day, as well as the fact that in addition to her own work, she does half that of another tug, bringing extra profit of $2500 a month.

Beyond the savings, which run over $14,500 a year, the characteristic Diesel features of a cooler engine room, a cleaner ship, no standby consumption of fuel and freedom from smoke, are all to the good. Her operating record over a space of two years has been of a most sensational nature. Since the installation of her Fairbanks-Morse marine Diesel, the *Buchanan Sisters* has never had to tie up for engine trouble; there has never been a break-down, and the only repair expense at all in the entire time has amounted to fifty-four dollars. In other words, Mr. Buchanan's maintenance expense to date has been a little over two dollars a month, or less than four and one half cents per horsepower per year.

The engine room of the *Buchanan Sisters* embodies the principles of simplicity and accessibility of equipment. Her main Fairbanks-Morse starboard rotation marine Diesel engine turns a Ferguson 3-Blade bronze propeller of special design and is fitted with regular built-in equipment and has a Maxim spark arrestor exhaust silencer. Her combination marine auxiliary set consists of a 10 hp. F-M Model 36A4¼ engine, type "H" F-M air compressor, seventy GPM F-M all bronze rotary pump and a two and three quarter, thirty-two volt, F-M generator, all mounted on a common steel sub-base.

Among the other auxiliaries are the Alnor pyrometer, and a set of 32 volt, 16 cell, Exide flat plate storage batteries furnished by the Electric Storage Battery Company. On the main switchboard, we find the pilot light, Weston Ammeters, field rheostat, the Hartman 50 amp. circuit breaker, a Ward Leonard circuit breaker, generator switch, etc. This takes care of the two generators, telephone, the Rex Cole Refrigerator, search light, centrifuge and light circuit. The distribution panel for lights is separate from the switchboard. Although it has been generally conceded that under 1500 shp., the marine Diesel is without competition, it would be difficult, indeed, to find an engine that has compiled a more striking record than on the *Buchanan Sisters*.

FOR many, many years there had been a hotel on Point Clear—at least a hundred years, so say the local historians. Point Clear is on the eastern shore of Mobile Bay, about halfway from the entrance of the bay to the causeway connecting the eastern shore with the city of Mobile. It is a rarely beautiful spot which has seen the cavalcade of history pass in review, from its discovery by the Spanish rover, de Pineda, in 1519, down through the centuries—Maldonado, the Le Moynes, Andy Jackson, Farragut, whose cannon slammed a shell into a cottage on the grounds—all of these men have known Point Clear.

The present Grand Hotel, construction of which was commenced less than two years ago, replaces a former Grand Hotel which in its heyday was nationally famous. The new institution, opened for business in April, 1941, is a considerable undertaking. The grounds, which are about forty acres in extent, are artistically landscaped with excellent beaches on two sides of the point. Yacht basin, tennis courts, garages, pavillions have been constructed. The hotel itself, from its appearance, might have been built generations ago, so carefully has the architectural design and engineering been accomplished. A rambling, spacious style, with long wings, it contains ninety guests rooms, every one an outside room and with beach frontage.

Giving modern service in a spot which fairly "speaks" the glories of the past is rather a problem, however. Point Clear is well off the main highway. The nearest town, Fairhope, is some miles distant and not a large city, by any means. Consequently, Point Clear is without the metropolitan conveniences and advantages usually essential to modern hotel practice. There is no water main, for instance. Neither is there any gas main. Also, the location is off the track of power transmission facilities. Modern hotels, however, must have different facilities from the gala establishments of generations ago, and there is no substitute for power: it must be had, from some source or other.

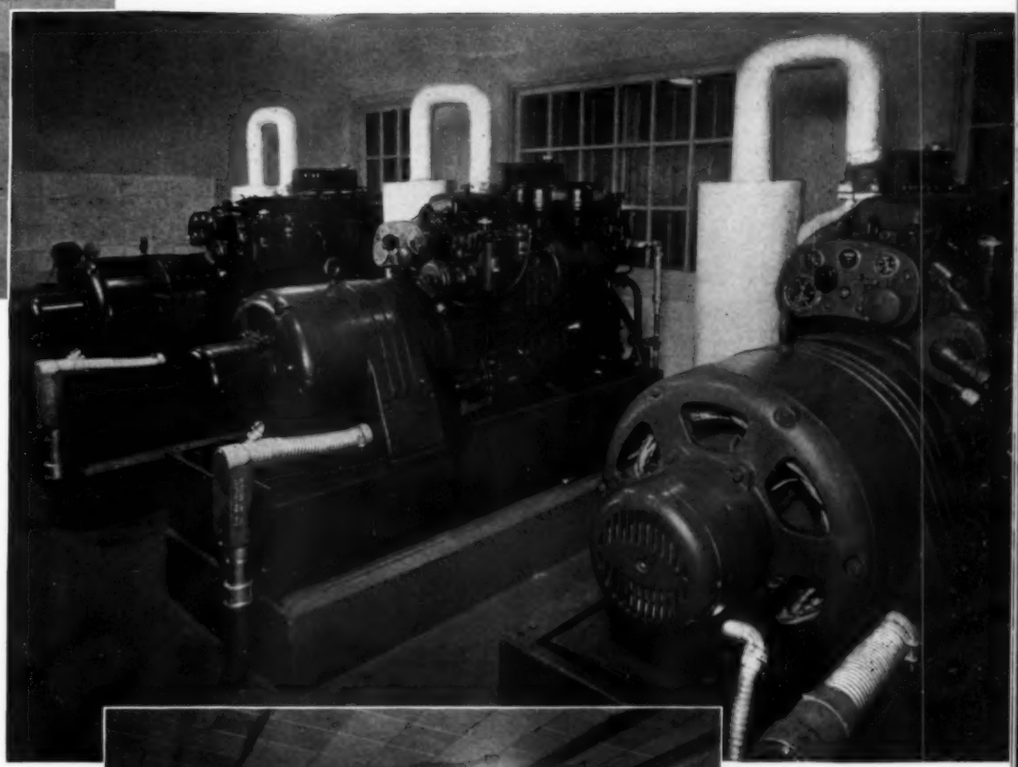
One of the prominent members of the company developing the project is well known in the nation's shipping and business field. He is well acquainted with Diesel from his personal use of Gray Diesels aboard his yacht, so similar power suggested itself for the hotel project. Purchase of electric current from commercial sources was considered; the local power company, a subsidiary of a state organization, was unable to make rates deemed economical and Diesel generation was accordingly determined upon. That decision having been made, sufficient power to fill all the needs was the next point to be settled. There is accordingly a triple installation of General Motors Diesels, of the six-cylinder model, rated at 90 hp. for continuous industrial use service at 1200 rpm. Each of the three Diesels is direct connected to a Delco generator of 60 kw., 208 amps.; 120-208 volts. Main leads from the generators go to the switchboard, which is General Electric-equipped, through conduits laid in the concrete engine-base. Switchboard is in three panels, one for each generator; each panel being fitted with ammeter, voltmeter, and watt meter; the board has also a voltage-regulator.

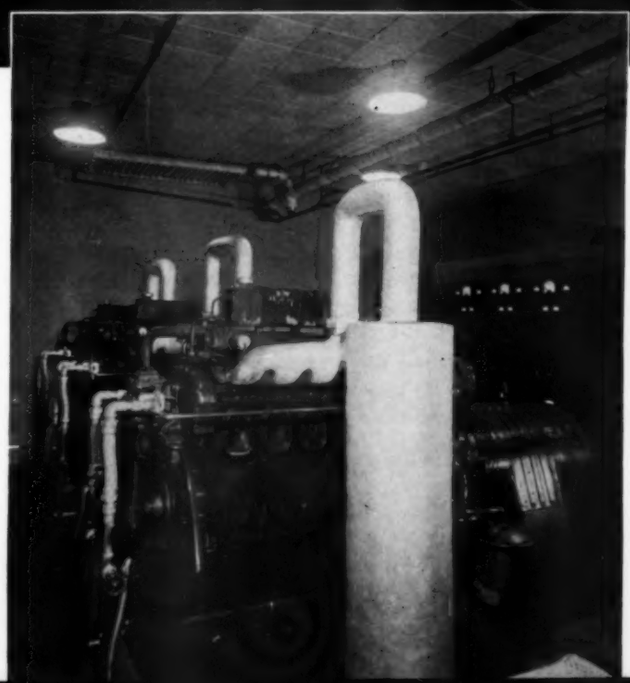
Current uses in the Grand Hotel are considerable: Lighting system for the hotel building and all auxiliary buildings, including lighting for the grounds; a multiplicity of small electric fans and five big exhaust ventilating fans, from 24" to 36" in diameter; driving pumps for the water supply system—two of these; a 15 hp. motor-and-pump Layne unit, and a 5 hp. unit of the same make. The hotel has its own deep well and depends upon these Diesel-electric pumps to fill its overhead storage water tank. Cooking is all done by electric ranges; all kitchen accessory machinery is electrically driven. As an electric range represents a dead-short proposition, current is a requirement. In addition to all this current consumption, the hotel also operates its own laundry with electric-driven tumblers, extractor, ironer, and presser. There is a large boiler-room with two oil-fired boilers for steam-heating and laundry requirements; the oil-burners are electrically operated. There is no ice-plant; electric-refrigeration is depended upon for cold storage, however, which means another demand for current and an urgent one.

While all three Diesels can be operated at once, so far this has never been necessary in spite of all the power consumed. One Diesel alone gets twenty-four hour operation, with another thrown in at the peaks. The daily cost for fuel and lube is around seven dollars. According to Van Cadenhead, manager of the Grand, current cost per kw. figures less than a cent and a half. As the hotel has been in operation for so short a time, with constantly increasing power uses, accurate costs are not yet possible and the cent-and-a-half figure does not give a true picture. Much more power can be used from these Diesels at very little more operating expense. That much is evident from performance so far and the hotel proposes to avail itself. An ice-plant is to be added, prob-

GRAND HOTEL

By WARREN GLEASON





ably in the near future. Air-conditioning throughout the buildings will be a feature, the ducts already having been installed.

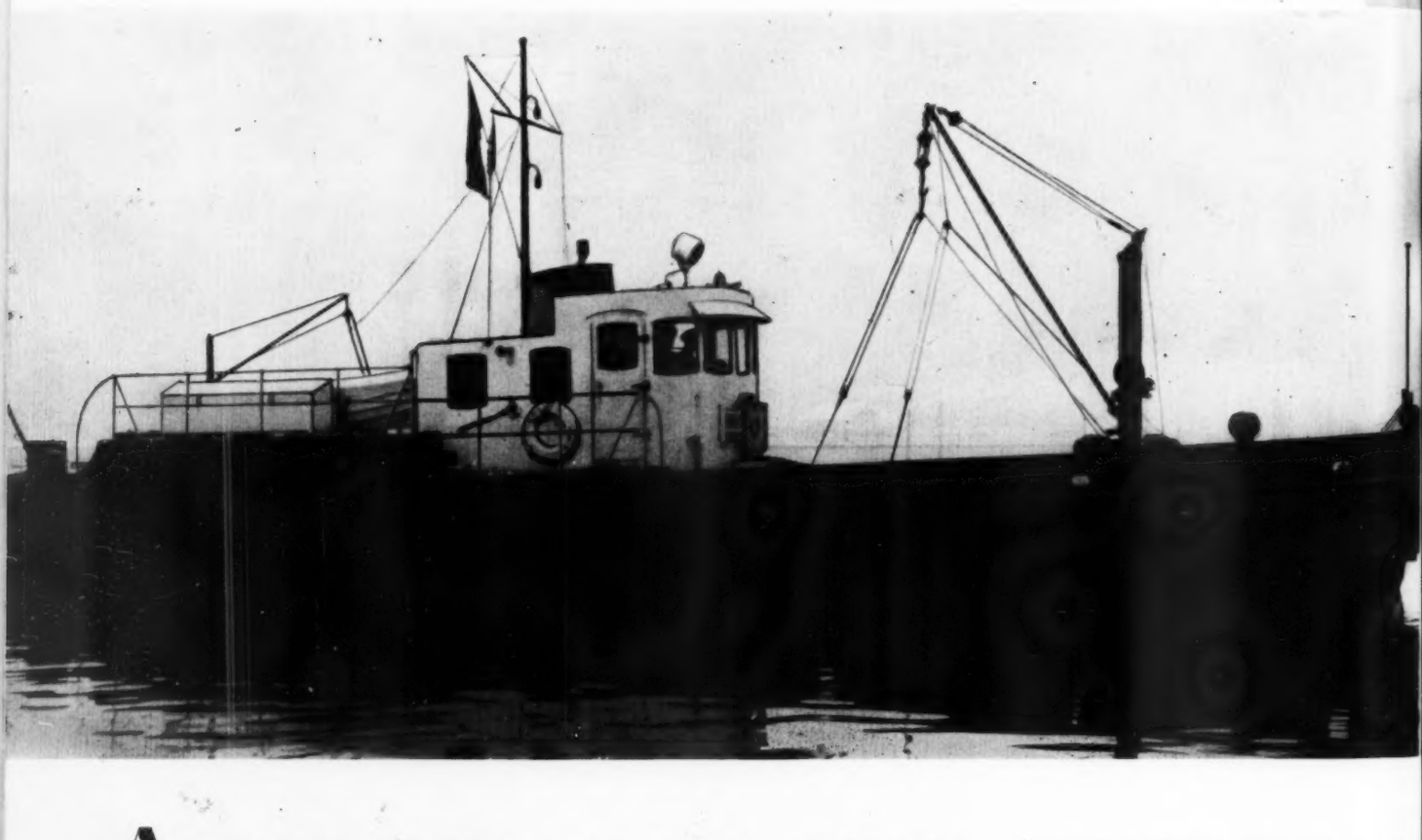
For cooling the Diesels, Harrison heat exchangers are used; though, with its own water supply and direct cooling expense no objection, it has been found that engine-temperature can be better controlled with the closed system. Three Luber-Finers have been installed for lube oil maintenance and have given perfect service. No other special equipment has been added to the engines, factory equipment of American Bosch injection, Woodward governors, A-C Kleer-Kleen fuel filters, etc., being entirely satisfactory. Lube used is Macmillan Ring-Free. The engine-room is rather small and very compact: the Diesels and the switchboard, together with a large work-table, are the only fixtures. Walls are insulated with Celotex tile; windows are double, in metal sash. And the job of installation is so excellent and free from any structural vibration that it is practically necessary to look at a tachometer in order to tell which engine is running. This may sound like exaggeration, but come to the Grand Hotel and look at the layout; it's a sweet-running power plant. Farragut never shot at anything like this!

Top view: Although new, Grand Hotel is designed in the tradition of Point Clear, a favorite resort for a hundred years. The author's wife "kindly consented." Above and left: Two views of the three General Motors, 6-cylinder, 90 hp. Diesels and Delco generators which supply power for all hotel services. Filters are Luber-Finer for lube, and AC for fuel and air.

"BIRCHFIELD BABY"

first Ship from the Pacific Coast's Newest Yard

By CHAS. F. A. MANN



A FUNNY, odd-looking little tub of a steel vessel is the *Birchfield Baby*—the new little 65 ft. x 14 ft. x 3 ft. shallow draft river Coast Guard Buoy Boat turned out by Birchfield Boiler & Shipbuilding Co. at Tacoma, newest steel shipyard in the Pacific Northwest, organized by Mr. T. Al Davies, dynamic head of several boiler companies in Tacoma, and managed by Gus Kobrow, renowned marine architect. But *Birchfield Baby* proved to Uncle Samuel that a good boilermaker could build boats fast and sound as a dollar, and it wasn't long after this ship departed for the Columbia River that Birchfield was busy on a contract for 6 100-ft. Enterprise powered Diesel tugs for the Maritime Commission.

As we go to press not one but all six of these steel hulls have been launched, and the $1,800,000 tug contract is but the beginning of another and much larger contract for more and bigger tugs.

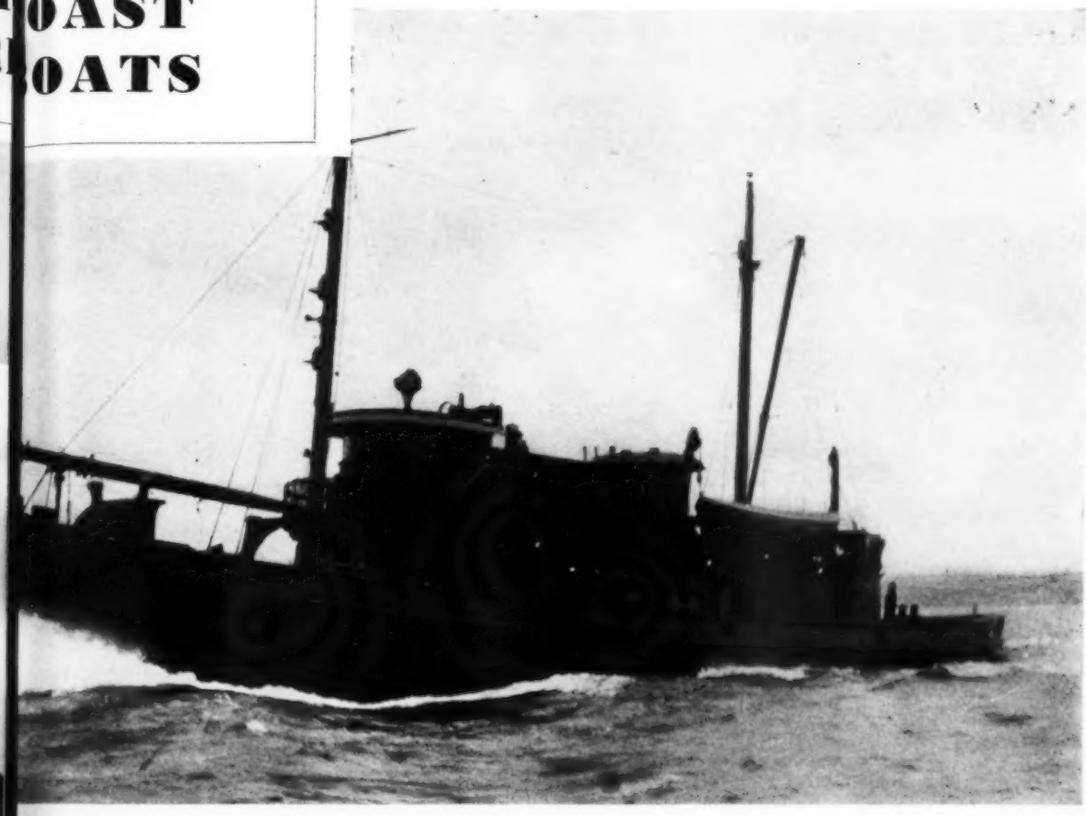
The *CG 521* is designed for very hard work on the upper Columbia River and the Snake River, and will lay and pick up navigation buoys. Of light, electrically welded construction, she is built of 3/16 in. steel plate, carries a 265 hp. General Motors 2 cycle Diesel, hand operated twin rudders, and a large cargo space forward. Crew space for six is fitted, and deck machinery is all electric, with two Yale geared electric hoists and towing knees on the bow.

A 3 kw. U. S. Motors generating set and 110 volt Exide battery is fitted; a Preferred Utility Co. heating boiler and Murphy Cabranette Galley Unit, everything in one compact unit, fed by bottled gas; a three bladed 29 in. x 25 in. Coolidge propeller and radio telephone set are among the major items of equipment.

The *Birchfield Baby*, swinging low in the water, is a complete, handy, brand new type of river vessel designed to extend the activities of the U. S. Coast Guard some 350 miles upriver above Portland, Oregon, first time in history.

And this is the first time two cycle main propulsion power has been used on upriver work.

EW OAST OATS



"AGNES FOSS"

largest of the Foss Fleet

FULLY equipped for heavy work on all coasts and on all oceans, the newest and largest of the Foss Tug & Barge Company's mighty fleet, operating out of Tacoma, Seattle, Everett, and Pt. Angeles, Washington, has joined the rapidly growing fleet of new and very much larger tugs that now move heavy loads over the whole North Pacific region.

In former years, the Diesel tug idea was built around a 150-450 hp. range of engine sizes; now, the 2,000 hp. North Pacific tug type, equipped for 25,000 miles cruising radius and sixty days at sea without putting into port, is the newest evolution in the pattern of water transport on the Pacific.

The new steel Foss tug *Agnes Foss,* largest of the fleet and named after the wife of Mr. Henry Foss, one of the three Foss Brothers who have built this amazing fleet, is a stout steel hull from a leftover Army Mine Layer, long since decommissioned. She is 150 ft. overall length and 30 ft. beam, with a gross tonnage of 304. Her capacious hold makes it possible for unique heavy duty layout of machinery, tanks, and storage space, as well as capacious below deck quarters for crew, and utilization of all the gigantic old steam towing winches intact, in their original below deck locations, with shaft extensions to the gypsies and windlasses.

The steam steering gear, niggerhead, and huge double-reduction geared steam windlass, converted to a heavy duty towing winch, were all left intact, and are now fed compressed air from four 3 ft. x 8 ft. steel air bottles, deriving air from two compressors mounted on the main Diesel engines, and auxiliary compressors, motor driven from the capacious auxiliary Diesel generator sets.

The power plant of *Agnes Foss* consists of twin, six cylinder, 750 hp. four cycle Enterprise Diesels driving Doran bronze propellers. For auxiliary power, she carries two 150 hp. Cummins Diesels, with double V-Belt drive for air compressors and auxiliary generators.

Manzel Lubricators are fitted to each main engine. Cutler-Hammer motor controls, and Trumbull Electric Co. switchboards are installed, as well as an RCA Direction Finder, regulation Navy type two-way radio, and two large Worthington air compressors. Quincy compressors are fitted to each auxiliary Diesel, Crane valves are used throughout, and G.E. generators are connected to each auxiliary Diesel. Three Crane water refiners are fitted for use at sea.

Deck machinery, including windlass and two niggerheads forward and the large towing winch aft, is mainly the same as originally fitted. The large towing winch will handle up to 1,500 ft. of 12 in. manila towing rope and 2,000 ft. of 2 in. steel cable. So large is this piece of equipment that it extends nearly 22 ft. of the total deck width. A 50 hp. gear-reduction motor has replaced the steam drive on this windlass, controlled from upper deck. Space for a total of sixteen in the crew is given over in the fo'csle, mostly in two-man rooms, with ample toilet facilities and locker space. The space fore and aft of the engine room is fitted up for large stores of fuel, lube oil, dry stores, and a large refrigerated food store supplied by a Baker Ice Machine unit. Aft of the engine room are spaces for the air bottles, water tanks and steering engine. A Nelson heating boiler for crew's quarters is also fitted. Officers rooms are on the upper deck, aft of the pilot house, as well as two small dinghies. The large galley, with Coolerator ice box, Ingle range and large locker space is on the main deck, directly below the pilot house.

25,000 HOURS WITHOUT A BREAKDOWN

By WM. H. GOTTLIEB

THE Liberty Milling Company of Germantown, Maryland, has an employee who works a fifteen hour daily shift, six days a week, and pays the company $5,000 a year for the privilege of rendering a service essential to operation of the mill. The philanthropic employee, of course, is not a flesh-and-blood superman but a sturdy Diesel engine which supplies all power requirements of the 250 barrel flour mill, the feed mill, and other machinery. Since its installation in 1936, the engine has run more than 25,000 hours without a single breakdown, a commendable record.

A. R. Selby, company head, has had experience with steam, Diesel, and purchased power and was in a position to compare performance and financial records before making final determination of his power policy. Before 1923, the mill operated a steam plant and, after that date, a small Diesel for part of the load with purchased power for the remainder. The mill switched to full Diesel operation in 1936 with the purchase of the present unit, a four-cycle, mechanical-injection Worthington Model C-4 Diesel engine. If the entire mill were run on purchased power, the cost per kw.hr. would be between 2.5 and 2.75 cents. The current Diesel cost per kw.hr. is about 9 mills, including fuel, lubricating oil, labor, maintenance, and depreciation. Using the 2.5 cent figure for purchased power and 1 cent for Diesel costs, the saving at present production levels amounts to more than $5,000 a year.

The experienced miller will recognize at once the additional cash value of continuity of service. Even a short interruption of power necessitates the time- and money-consuming task of cleaning the rolls. Labor and loss of production are costly. This plant's record of six years of service without a breakdown demonstrates conclusively that Diesels have solved the Liberty mill's need for dependability of power supply. Such service records usually can be traced to a wise choice of equipment, plus capable operation, and this plant is no exception. The engine is given a thorough inspection once a year and the company assures itself that the unit is in condition for another full year of uninterrupted service. For the most part, the Diesel runs without an operator in attendance but an alarm system has been provided to summon him from the mill in case lubricating oil pressure drops or cooling water temperature rises above a predetermined point. An Alnor exhaust pyrometer and Rochester pressure gauges are arranged conveniently so that the operator can check on operating conditions almost at a glance.

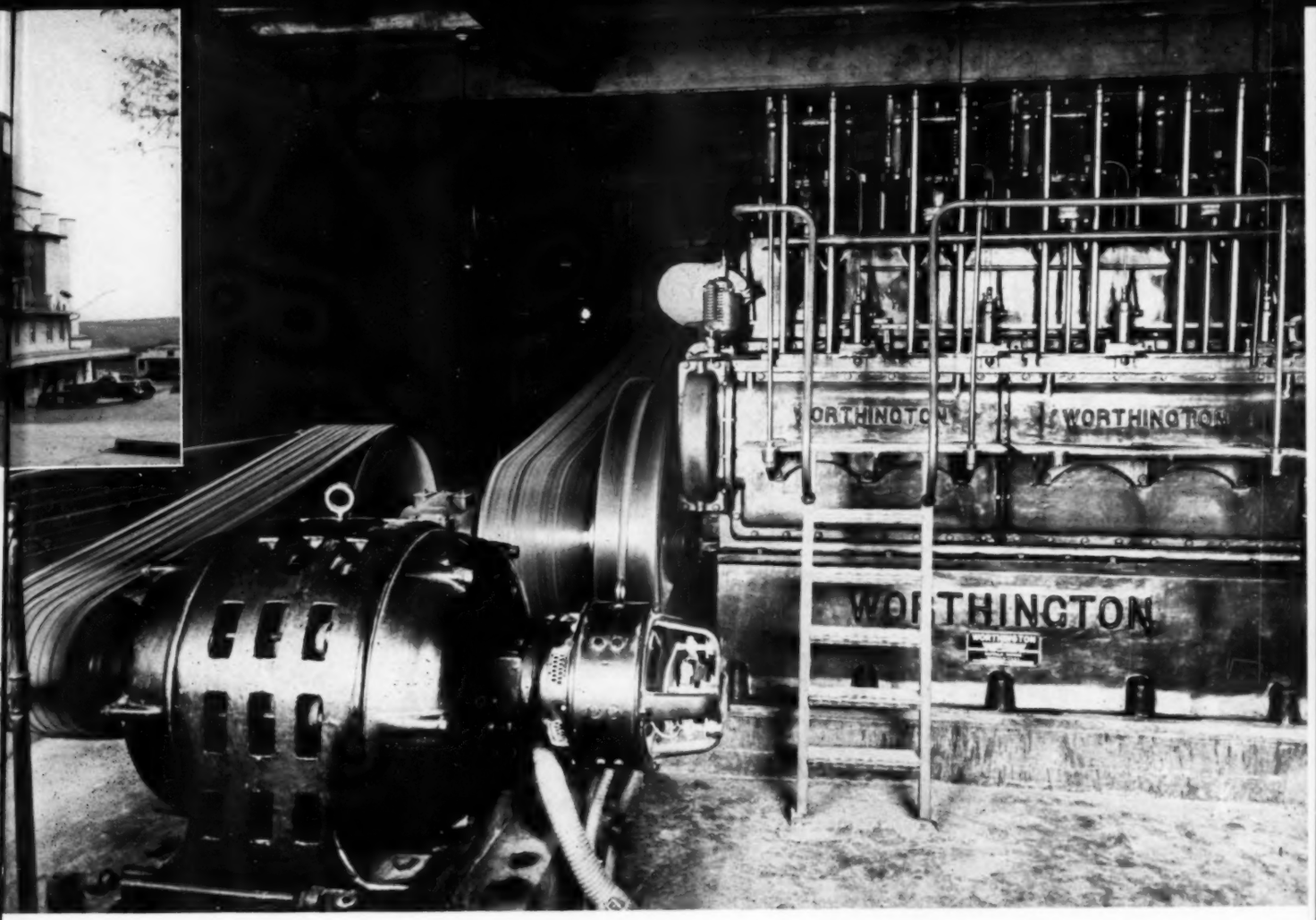
The flour mill is driven off a line shaft which is belted to the Diesel. The feed machinery, hammer mills, mixers, driers, and other equipment have electric motor drives. To supply the required electric power, the Diesel is V-belted to a 94 kva., 80% pf., three-phase, 60-cycle, 240 volt F-M alternator with 2 kw. direct-connected exciter. The total connected load is over 200 hp. of which the electric motors make up 85 hp. At times the engine is called upon to carry an overload but the average through the fifteen-hour day is about 105 hp. At best, a mill of this type provides a hard, uneven load but the power plant seems to handle it with ease and efficiency.

Important to the performance of the plant is the care taken to protect the engine against unnecessary wear and contamination. Fuel, lube oil, and air are filtered and jacket water is softened. The No. 2 fuel oil is stored in a 10,000 gallon tank above ground outside the plant and transferred by a motor-driven reversible rotary pump to a 200 gal. overhead day tank in the engine room. The No. 2 Gulf fuel flows by gravity through a Cuno filter to the engine injection pumps. Mr. Selby reports that fuel consumption is "well under .4 lb. per brake hp.hr." Average consumption is 5½ gals. an hour. Fuel injection is regulated to meet load by a Pickering centrifugal governor.

Lubricating oil is circulated to the bearings under pressure by an engine-driven gear pump. In the continuous circuit are a Cuno edge-type filter and a Groco shell-and-tube oil cooler. In addition, a Skinner cartridge-type purifier is arranged for continuous by-pass service. Cylinders are served by a Manzel mechanical lubricator. Average consumption of lube is only two quarts in fifteen hours. It is the practice in this plant to drain the crankcase every three months and put in a fresh charge of oil. This requires about 25 gallons. With fuel at 5.7 cents a gallon and lube oil at 64.5 cents a gallon, the cost of fuel and lube is under 35 cents an hour or about 3.3 mills per bhp.hr.

The cooling water system is of the open type with water circulated through the engine jackets and over an atmospheric cooling tower by a reciprocating pump belted to the engine.

All makeup water is treated in a zeolite softener. Engine air is drawn from the engine room through a Vortox oil bath filter mounted near the Diesel. Exhaust gases flow from the header down to a concrete pit then up through a stack to the atmosphere. There are two start-



Upper left: The Liberty Milling Company plant at Germantown, Maryland. Above: The Model C-4 Worthington Diesel which operated more than 25,000 hours without a breakdown saving $5,000 per year.

Bagging machinery is driven off the line shaft which the Diesel drives in addition to the generator.

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The Diesel is located in a room adjoining the main business offices and a good neighbor it has been. The Liberty Milling Co. appraises its power plant in a hard headed business fashion with every element of cost subjected to critical analysis. In arriving at the Diesel cost of under nine mills per kw.hr., every legitimate cost has been included and Mr. Selby asserts that he leans over backwards in allocating expenditures to the Diesel. Despite this conservatism, the Diesel plant has meant a profit of more than $30,000 since its installation as compared with purchased power costs. With the plant in excellent condition, the company looks forward to an equal record of economical and dependable service in the decade to come.

The Fairbanks-Morse and Quincy air compressors are seen in this view. The lower half of the Vortox oil bath air cleaner is seen upper right.

25,000 HOURS WITHOUT A BREAKDOWN

By WM. H. GOTTLIEB

THE Liberty Milling Company of Germantown, Maryland, has an employee who works a fifteen hour daily shift, six days a week, and pays the company $5,000 a year for the privilege of rendering a service essential to operation of the mill. The philanthropic employee, of course, is not a flesh-and-blood superman but a sturdy Diesel engine which supplies all power requirements of the 250 barrel flour mill, the feed mill, and other machinery. Since its installation in 1936, the engine has run more than 25,000 hours without a single breakdown, a commendable record.

A. R. Selby, company head, has had experience with steam, Diesel, and purchased power and was in a position to compare performance and financial records before making final determination of his power policy. Before 1923, the mill operated a steam plant and, after that date, a small Diesel for part of the load with purchased power for the remainder. The mill switched to full Diesel operation in 1936 with the purchase of the present unit, a four-cycle, mechanical-injection Worthington Model C-4 Diesel engine. If the entire mill were run on purchased power, the cost per kw.hr. would be between 2.5 and 2.75 cents. The current Diesel cost per kw.hr. is about 9 mills, including fuel, lubricating oil, labor, maintenance, and depreciation. Using the 2.5 cent figure for purchased power and 1 cent for Diesel costs, the saving at present production levels amounts to more than $5,000 a year.

The experienced miller will recognize at once the additional cash value of continuity of service. Even a short interruption of power necessitates the time- and money-consuming task of cleaning the rolls. Labor and loss of production are costly. This plant's record of six years of service without a breakdown demonstrates conclusively that Diesels have solved the Liberty mill's need for dependability of power supply. Such service records usually can be traced to a wise choice of equipment, plus capable operation, and this plant is no exception. The engine is given a thorough inspection once a year and the company assures itself that the unit is in condition for another full year of uninterrupted service. For the most part, the Diesel runs without an operator in attendance but an alarm system has been provided to summon him from the mill in case lubricating oil pressure drops or cooling water temperature rises above a predetermined point. An Alnor exhaust pyrometer and Rochester pressure gauges are arranged conveniently so that the operator can check on operating conditions almost at a glance.

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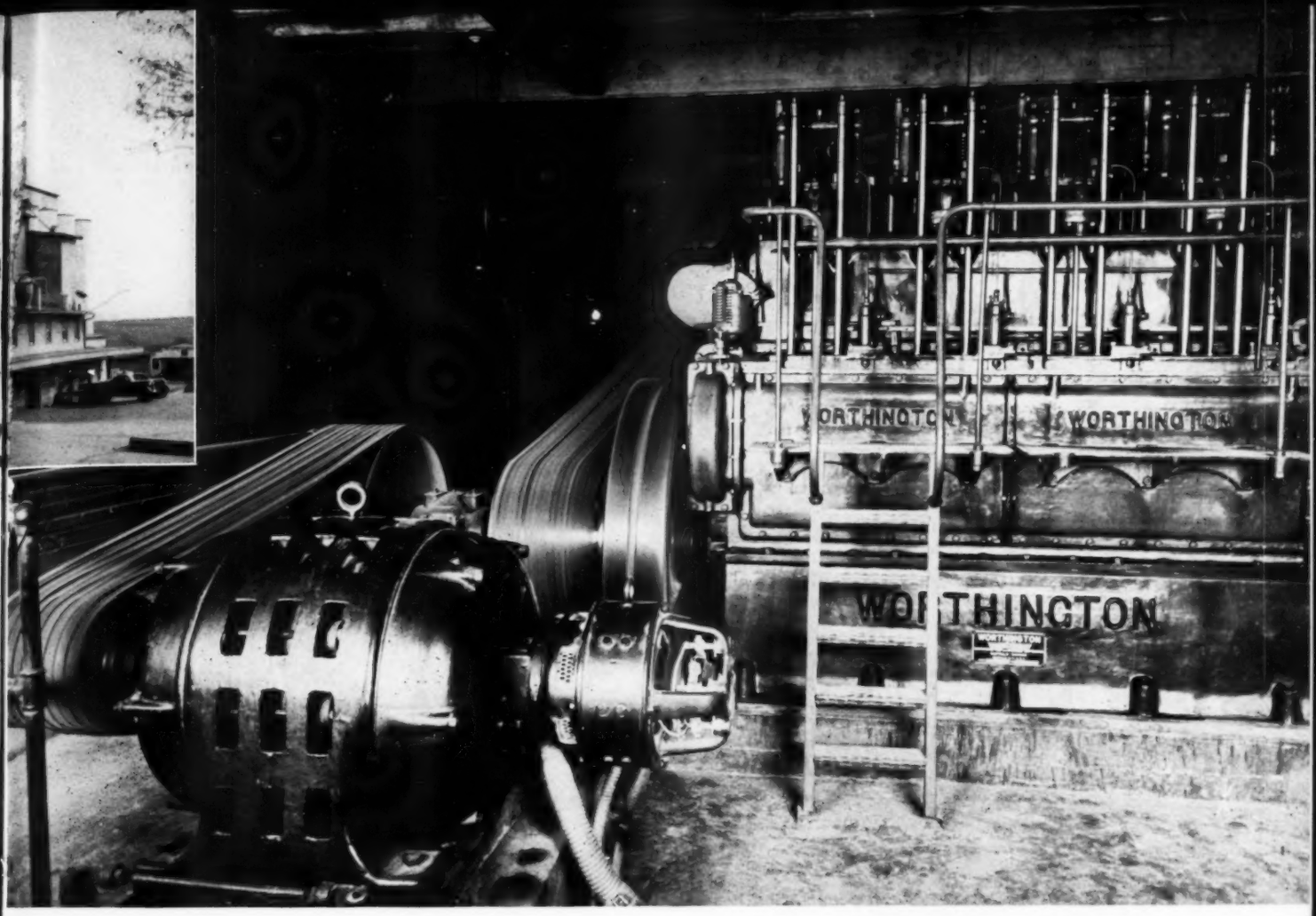

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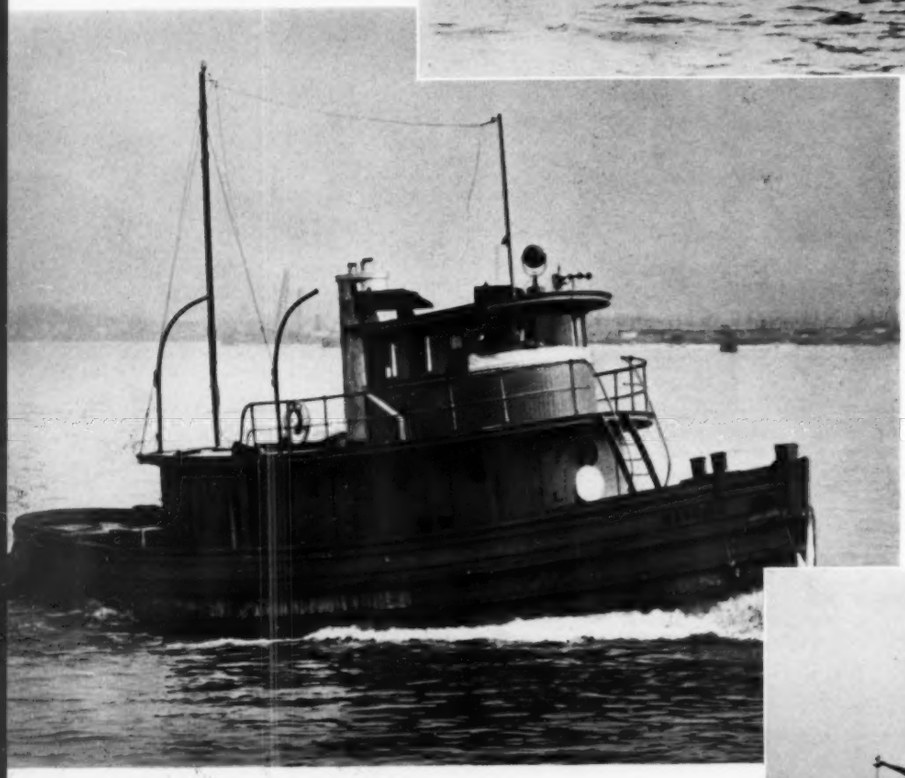

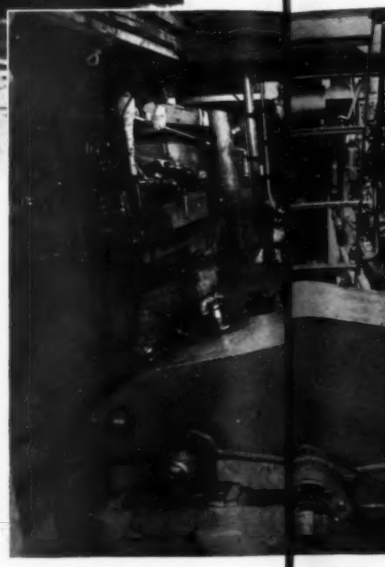

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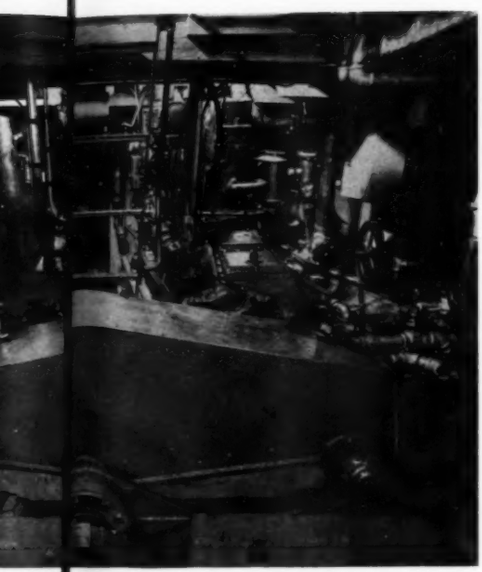
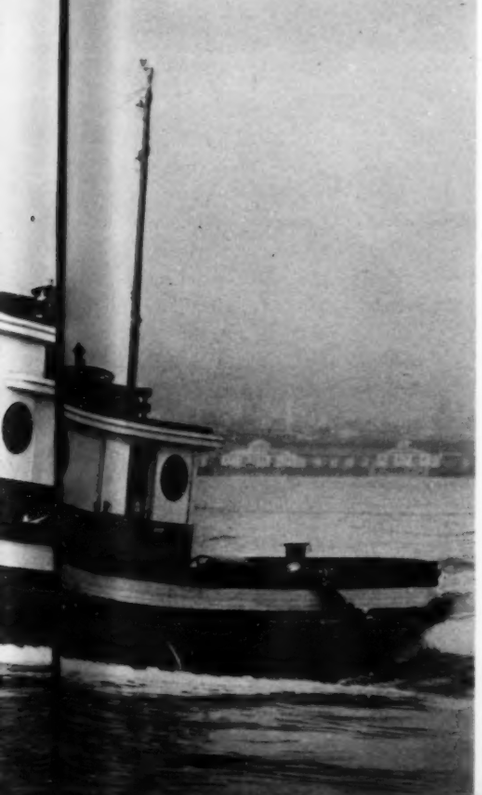
Top, above, and right are seen respectively the Loveland Towing Company tugs, "Clinton", "Maguire", and "Wm. J. Scott", seagoing vessels all repowered with Buda-Lanova Diesels driving through Twin Disc reduction and reverse gears, and Morse Chain drive.

HIGH SPEED DIESELS REPOWER LOVELAND TUGS

By DWIGHT ROBISON



gine room view on the "Maguire", showing pair of Buda-Lanova, 6-cylinder marine sels, Twin Disc gears, and Morse Chain ve. Note De Luxe lube oil filters on engines.



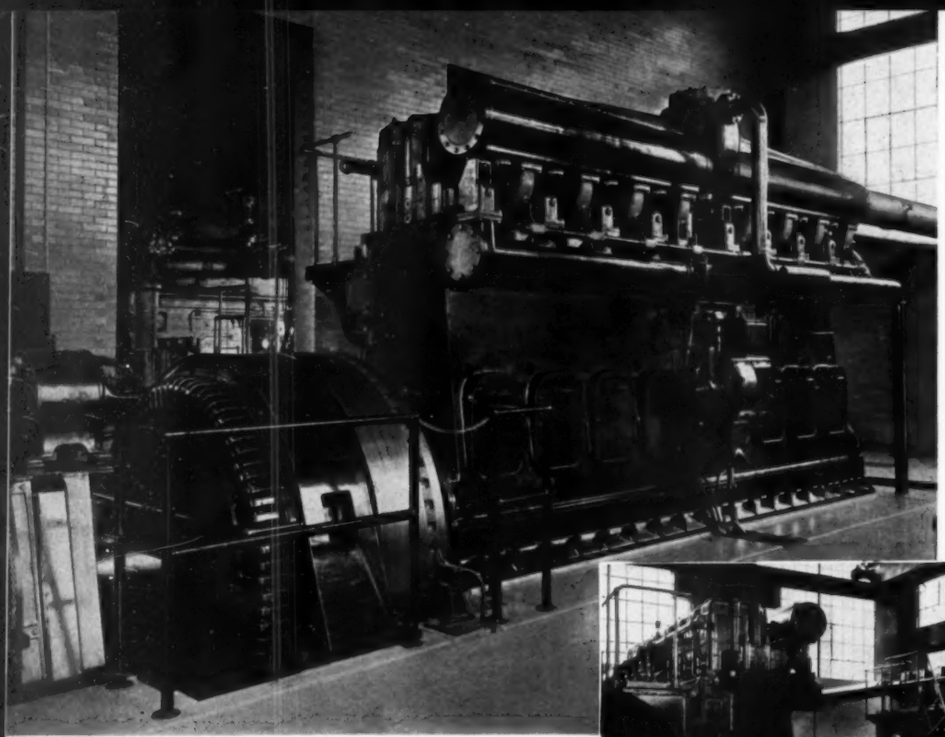
THE Loveland Towing Company of Philadelphia has long been widely known to the Delaware River and coastwise tugboat fraternity. The far flung services of the Company's busy fleet reflect the driving force of Sam Loveland who has headed up operations for the past ten years and whose ability received signal recognition in his recent appointment as assistant to Admiral Land of the United States Maritime Commission.

Loveland towing and transportation activities extend from Key West, Florida, to Boston, Massachuetts, based on its fleet of tugs comprised of the *Solarina, Active, Cyrene, Clinton, Wm. J. Scott, Maguire,* and a number of barges. This fleet constitutes one of the major freight transportation operations in this area. The last three named tugs, after years of service under their original steam power, have been converted with Buda-Lanova Diesels and are now writing a new chapter in Loveland's towing experience. These conversions were made after long protest on the part of Bob Maguire of Loveland Towing Company, a self-confessed die-hard steam man, who now cannot find words to express his enthusiasm for Diesel tug propulsion. The *Wm. J. Scott* was the first to be converted, getting its Buda Diesel two years ago; the *Clinton* was converted with the same make of engine a year ago; and the *Maguire,* after extensive remodeling and repowering with a pair of Buda Diesels, Twin Disc 2:1 reduction gears and Morse Chain drive, reentered service March 1 this year. The *Maguire* measures 65.7 ft. long, 18 ft. wide, and 9 ft. deep. All three tugs are in service twenty-four hours a day—six and seven days a week, and their records show a reduction of 50% in operating cost over their previous steam plants. An interesting feature of the *Maguire* propulsion machinery is the roller chain drive unit which connects the two Buda Diesels to the propeller shaft. In this unit, which was specially designed by Morse Chain Co., the chains are totally enclosed and run in an oil bath and operation is entirely noiseless. The 2:1 reduction in this drive unit together with that of the reduction gear gives a total of 4:1 between engine rpm. and propeller shaft speeds. This arrangement could easily account for the *Maguire's* master's statement that he never saw anything like her for pulling.

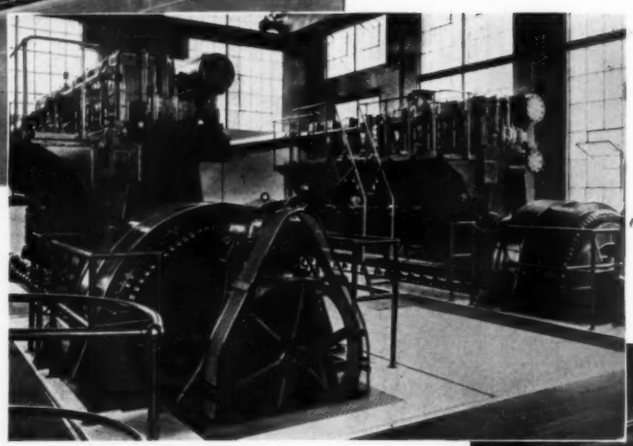
Each Buda Diesel on the *Maguire* drives a generator for charging the two sets of Willard batteries—one for ship's lighting, the other for engine starting. A Delco, 800 watt generator set is provided for auxiliary charging. Each engine is fitted with three-fold fuel oil filter equipment consisting of Briggs Clarifiers, Stewart-Warner and Purolator filters while lube oil is maintained by De Luxe duplex filters. She carries tank capacity for 5000 gals. of fuel, 300 gals. of lube, and 2500 gals. of fresh water. An emergency fire and bilge pump is driven by a F-M gasoline engine. Pilot house equipment consists of Allen electric clutch control and Bendix hydro throttle control so arranged that either Diesel may be run independently of the other and tests have shown that one engine would maneuver the vessel most satisfactorily. A typical two days' operation of the *Maguire,* reported on March 25 and 26 starting at 5:30 A.M., showed continuous operation in short hauls about the Delaware River up to 5:30 the first day when the Loveland Towing Company's barge *Renssaeler,* loaded with 500 tons of steel and drawing 10 ft. of water, together with a light barge, drawing 4 ft., were picked up at So. Chester, Pa., and taken through the Delaware Canal to Sparrows' Point, Md., at an average speed of 4½ knots, and from thence to Newport News, Va., with another 500 tons of steel. These operations require the best of maneuverability and stamina,—a full measure of which are provided by these Loveland Diesel tugs. Bob Maguire, the once staunch steam devotee, said he has never once been sorry for his decision to try Buda Diesels.

12.1 KWH. PER GALLON

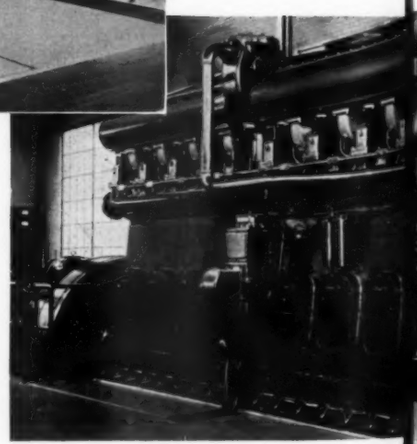
By W. T. BURGESS



Eight-cylinder, 1000 hp. Cooper-Bessemer Diesel and 700 kw. Allis-Chalmers generator at Lebanon, Ohio.



These two identical Cooper-Bessemer Diesel generating units replaced a not so-old, but unprofitable steam plant.



THE Village of Lebanon, Ohio, has the distinction of being one of two communities in the Buckeye State in which the four main public utilities are community-owned and operated. A typical Ohio village, of about 4,000 population, Lebanon lies about midway between Cincinnati and Dayton on U. S. Highway 42.

Taking its rightful place at the head of the four publicly owned utilities, a new Diesel-electric plant at Lebanon was placed in operation on Thanksgiving Day of 1941. It furnishes electric power for village homes, business places, public buildings, institutions, and street lighting, and marks a big step forward over the old steam-engine-equipped plant. Among the heavy industries which derive their power from this new electric plant are a plating works, a shoe factory, and a bridge works. In planning and building their new municipal power plant, Lebanon officials were careful to provide ample horsepower in the prime movers to guarantee the plant's ability to meet any reasonable increase in demand made upon it in the near future.

The machinery chosen was two Cooper-Bessemer, 8-cylinder Diesel engines, each rated 1,000 hp. at 300 revolutions per minute, and two Allis-Chalmers 700 kw. generators. One of the reasons for building this new power plant was the fact that the old steam-driven equipment provided no adequate standby power for emergencies. Too, with the growth of Lebanon, the plant was just about up to full capacity in supplying the normal every-day needs of the community. The original steam power plant was adequate when installed in 1921; however, the plant load increased rather rapidly during the period from 1938 to 1941. In 1939, the units were called upon for 3,900,000 kwh., the following year 4,233,000 kwh., and 1941 saw 4,540,000 kwh. produced.

The old steam plant at Lebanon still had a $36,000 bonded indebtedness standing against it when it was finally decided to replace existing facilities with a new Diesel plant. The bonds were held by a local bank. The bank agreed to spread this indebtedness over twice the number of years originally intended, and mortgage revenue bonds were sold to cover the cost of building the new plant, which was $175,000. The Froelich and Emery organization of Toledo, Ohio, were chosen as consulting engineers and designers of the new plant. A. Benzing and Sons of Hamilton, Ohio, were contractors. Obstacles which came up during planning, installation, and placing in service of the new plant were numerous as is usual in any economy-minded small community.

In 1896, Lebanon's Board of Water Works Trustees was organized to operate the city's water system and, in 1898, the operation of the municipal electric plant came under its jurisdiction. In 1903, a Board of Trustees of Public Affairs replaced the water works group and took over the operation of all public utilities. This three-member board and the then-incumbent mayor worked zealously in the funding, planning and final realization of the new power plant. Backed by the first-hand realization that new and better electric power facilities were a growing necessity, L. F. Wertz, Clerk of the Board of Trustees and Superintendent of Public Utilities, was another whose efforts for the new plant were untiring.

The two new Diesel engines and generators are housed in a modern addition to the old steam power plant. The Ames Uniflow vertical steam engines of 400 kw. capacity each now serve as standby units for the Diesels, giving the plant a total capacity of 2,200 kw. The steam units are arranged for parallel operation with the new Diesel engines. All auxiliaries are located most advantagously in the basement of the new building.

Generators which are direct-driven by the Diesel engines are Allis-Chalmers units of 875 kva., 700 kw., 2400 volt capacity and the two 15 kw., V-belt exciters are pedestal mounted above the generators' outboard bearings. The generator rotors and flywheels are combined for a compactness typical of recent Cooper-Bessemer engine installations in which this arrangement is utilized. An Alnor 16-point-and-off pyrometer with flexible thermocouples serves the two new engines. Two 20,000 gallon fuel oil tanks are located outside of the building and above ground. A 3 hp. motor-driven fuel oil unloading pump, capable of 35 gallons per minute against a 100 foot head, serves these two tanks. Liquidometers, reading in gallons, are installed on the ends of both tanks.

The day tanks for each of the engines are of 275 gallon capacity and located in the basement. Two ¾ hp. motor-driven fuel transfer pumps serve these tanks and are augmented by a hand operated pump for emergencies.

Lubricating oil strainers are 3 inch duplex type, of Hayward make and 120 gallon per minute capacity. These filters are full-flow type and filter all lubricating oil, including that used for piston-cooling. They are installed in the oil-circulating system just ahead of the point where lube oil enters the engines, to insure full protection. Lubricating oil is also continuously filtered by a Nugent bleeder type oil conditioner which removes carbon and foreign material from the oil and treats it against acidity. The combination of these two types of filtering and conditioning units automatically maintains the lube oil in excellent operating condition at all times, and at minimum expense. Two 400 gallon lubricating oil sump tanks are located in the basement.

Fuel oil filters, mounted on the engines, are Purolator units consisting of two bag and edge type filters arranged in series. There are also two Hayward, 1½ inch duplex fuel oil strainers located between the outside storage tanks and the fuel oil transfer pumps. The fuel oil lines are so arranged that oil may be drawn from either storage tank by either pump for either engine, and the hand-operated emergency pump also functions in this manner.

A Marley cooling tower serves the plant and its supply of water is taken from the city-owned lines which emanate from deep wells fitted with turbine pumps. This tower has a capactiy of 1000 gpm. and is divided into two sections, one for each engine. Ross heat exchangers are used for jacket water temperature regulation. Water softeners are Permutit units of Zeolite manufacture and these were already installed for use with the previous steam-driven plant.

Two pumps are used on each engine for cooling water circulation. One for raw water and one for soft water through the engine jackets, the heat transfer being made through the heat exchangers. One extra raw water and soft water pump are installed and so connected that they may be used on either engine in case of emergency. All of these pumps are Weinman, double suction, horizontally split case full bronze fitted, direct connected to Allis-Chalmers squirrel cage induction motors operating at a speed of 1750 rpm. The raw water pumps have a capacity of 500 gpm. at 65 foot head with 15 hp. motors. The capacity of the soft water pump is 350 gallon per minute at 78 foot head with 10 hp. motors. It is obvious that the new plant is using considerably less water than the old did.

Starting air for the Diesel engines is furnished by a Quincy, 5-hp., 2-stage, 250 pounds working pressure, motor-driven compressor. Four 30 in. by 103 in. air tanks are installed in the basement. A gasoline engine driven, water-cooled, compressor unit of the same size and by the same maker serves as a standby in case of emergency. The engines are fully safeguarded by Mercoid type alarms against low cooling water supply, high water temperatures and low lube oil pressures. Air filters for the Diesels are Vortox and the exhaust snubbers are Burgess make. Governors for the two units are the Pickering Isochronous hydraulic-relay.

The average peak load on Lebanon's new power plant totals slightly over 1,000 kw. and it is estimated that the plant will have a yearly output of over four and a half million kwh. under prevailing conditions. Records of the plant show a production of 12.1 kwh. per gallon of fuel. At present the village is paying 5.65 cents per gallon for fuel oil delivered at the plant.

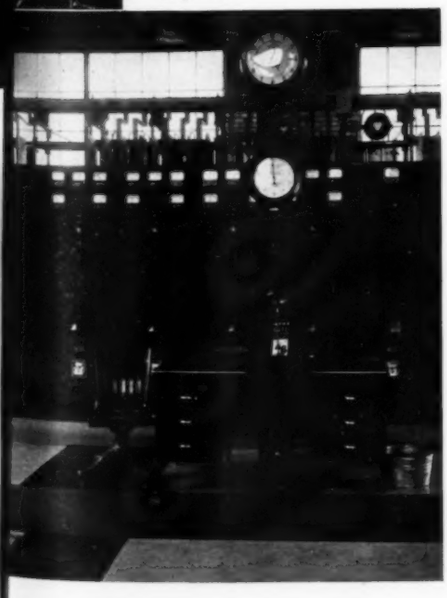
With the old steam plant, coal was costing the community three-quarters cent per kw., whereas today's fuel oil is costing one-half cent per kw. and the people of Lebanon are enjoying a low electric rate when compared with other communities of the same size and type.

The switchboard for the plant is of the modern dead-front type with steel panels, and was manufactured by the Allis-Chalmers Company to design and specifications of Froelich and Emery, the engineers in charge.

It is interesting to note that since these closely controlled new generating units have been installed, with their isochronous governors and modern facilities for paralleling the units, the town's people have been quick to make it known that their electric clocks are running perfectly. This speaks well for the automatic control of the power output of the plant and for the engine's ability to absorb sudden load changes without noticeable fluctuation of plant output or surges in the lines—just one of the many benefits of Lebanon's fine new power plant, for which its citizens and officials are to be commended.

In this view the engine mounted Purolator fuel filter and Alnor exhaust thermocouple connections are seen.

The modern dead front switchboard made by Allis-Chalmers for the Lebanon plant.




e to Sea!
U. S. Army Mine Planter, ELLERY W. NILES
U. S. Engineers Stern Wheel Towboat, GILLETTE
U. S. Engineers Stern Wheel Towboat, J. B. BATTLE
ENERAL MOTORS
DIESEL

HISTORY REPEATS ITSELT

By GEORGE D. CROSSLEY

JUNE 3, 1942 marked a big day in the history of American shipbuilding at the Head-of-the-Lakes when two sleek oil tankers slid off their blocks to hit the water at the Riverside Yards of the Barnes-Duluth Shipbuilding Company. It marked, too, the rebirth of shipbuilding in Duluth, after a lapse of twenty-five years when, in World War No. 1, the same Julius H. Barnes as President of the McDougall-Duluth Shipbuilding Co. turned out ships which helped defeat the enemy.

"For," as Mr. Barnes so aptly put it, "the battles of the Atlantic, the Gulf, the Pacific are being fought here at the Head-of-the-Lakes, as well as on the high seas."

Honoring two Duluth men who were killed in the Pearl Harbor sneak attack by the Japs on December 7, the occasion brought to the Yards Admiral Harold L. Vickery, Vice-Chairman, United States Maritime Commission, Washington, D. C., with his two aides, William A. Weber, Assistant to Admiral Vickery, and A. E. Spoffard, Reginal Construction Director, Great Lakes area; Honorable Harold E. Stassen, Governor State of Minnesota; Julius H. Barnes, President of the Barnes-Duluth Shipbuilding Company; Arthur C. Dodge, Vice President, Fairbanks, Morse & Co., whose Diesel engines will propel all twelve of the U. S. M. C. tankers now being constructed in the Barnes-Duluth yards and many other notables in the marine fraternity.

The dual launching of the *Mannington* and the *Tarentum* brought also to the yards over 7000 spectators who cheered and acclaimed the new additions to the nation's sea strength. Truly, it is the biggest and most colorful launching spectacle Duluth has seen since the first World War.

It was an appropriate choice of sponsors, too. As the *Tarentum* and then the *Mannington* slid down the greased skidways, relatives of Andrew Alloise Walczynski and Robert Cameron McQuade, the two Duluth war dead, crashed the bottles of champagne on the bows. Eighty year old Mrs. Catherine Walczynski, whose honored son was born in Poland, her daughter Mrs. Clem Moniak, and grand-daughter Catherine were special guests at the *Tarentum* launching with Mrs. Moniak performing the ceremony. Mrs. Catherine McQuade Berg, sister of Robert Cameron McQuade, a sixth generation American, christened the *Mannington*. A Polish immigrant boy, educated in Duluth, and an American lad six generations back—symbolical of the melting pot typified by these United States. One in the Navy and the other in the Army—both died for their country on December 7—could any choice of sponsors have been more appropriate?

The day also focused attention on the stalwart records of the three participants—Great Lakes shipbuilding, the Port of Duluth, and Julius H. Barnes, President of the Barnes-Duluth Shipbuilding Company, all of whom are again serving America in her time of need.

These two new coastal tankers are of U. S. Maritime Commission TI-M-AI design and are very much like others now effectively used in coastal shipping. They have an overall length of 220 ft. 6 in., a breadth, molded, of 37 ft., a depth, molded, of 14 ft. 6 in. and a draft of 12 ft. 11½ in. Built of steel in the single deck, full center expansion trunk type with raked stem and cruiser stern, they give ready evidence that, when finished, they will be both trim and dependable.

Accommodations are provided for the ship's complement in the afterhouse above the main deck, consisting of a poop deck, boat deck, bridge deck, and house top. The forecastle deck is provided forward of the cargo hold with space immediately beneath for various store rooms. The operating personnel of twenty-three includes a captain, chief engineer, chief mate, two assistant engineers, two assistant mates, three seamen, three enginemen, two radio operators, a cook, mess boy.

The twin vessels, with all equipment and propelling machinery, are built under special survey of the American Bureau of Shipping, and are distinguished as the highest class in the Bureau's record book for low flash cargo.

The main power for each tanker is furnished by a five-cylinder, 16 in. bore by 20 in. stroke, Fairbanks-Morse marine Diesel engine. Generating sets for port and starboard use each comprise an eight cylinder Fairbanks-Morse Diesel-electric unit, driving a Crocker-Wheeler marine type generator.

The engine room when completed, in addition to the Fairbanks-Morse marine Diesels with standard built-in equipment will contain such engine accessories as Schutte & Koerting lubricating oil cooler, duplex lube oil strainer and cooling water heat exchanger, Maxim spark arrester type exhaust and air intake silencers, and Kingsbury external thrust bearing.

The generating set accessories will include two Briggs lubricating oil filters, two Cuno full flow type lubricating oil strainers, a pair of Alnor pyrometer instruments with engine thermocouples, Burgess combination air cleaners and snubbers, Ross cooling water heat exchanger, and Maxim spark arrester exhaust silencers.

Further engine auxiliary equipment will include the standby oil and water pump units, each comprising a Fairbanks-Morse auxiliary combination pumping unit, consisting of a 15-hp., double-end, direct-current, marine type motor mounted on a common bedplate and direct connected to a 405 gpm. water circulating pump and a 120 gpm. lubricating oil pump for before and after cooling of the main engine. Each unit is of sufficient capacity for standby service for the built-in pumps on the main propulsion engine.

There is also a motor driven standby air compressor, comprising a Quincy two-stage air cooled compressor mounted on a steel base and V-belt driven with a 3-hp. direct current, Fairbanks-Morse, forty degree marine motor. The compressor is fitted with intake air filter, loadless starting device and drip-proof automatic pressure switch.

EAT BARNES-DULUTH

Scene at the yards of the Barnes-Duluth Shipbuilding Company where the U. S. M. C. Tanker "Tarentum" hit the water. Fifteen minutes later the U. S. M. C. "Mannington" also was launched. These are the first two of twelve such tankers of similar design now in construction at the Head of the Lakes.

In launching these first two tankers, the Barnes-Duluth people are focusing attention on the vital role being played by Great Lakes shipbuilders. We on the eastern seaboard are perhaps too prone to talk of shipping and shipbuilding as if it were confined to the stretches of the Atlantic Coast from Maine to Florida, or, at best, including our West Coast friends, An occasion such as this may well cause us to reflect on the magnificent role played by the Great Lakes during the last war—one that is being even more diligently prosecuted today.

Entering Duluth, most famous port of the northeastern part of Minnesota, one may pause for a moment at Rest Point and take in, far below, the vivid blue water of Lake Superior, home of Great Lakes shipbuilding. It seems difficult for the casual observer to realize that the Port of Duluth is second in net tonnage only to New York and this, in spite of the fact that she has an average season of only eight months, the lake being frozen over the rest of the time. The Port of Duluth handles in the vicinity of 48,000,000 net tons a year and this figure has risen above 60,000,000. Fifty percent of this is iron ore, the balance coal, limestone, grain, etc. Her large modern docks take care of shipments valued at over $485,-000,000 yearly, and this figure is rising rapidly.

The Great Lakes, serving as a splendid water highway among the lake cities, between this country and Canada and from the lake states to the Atlantic Coast, are a natural habitat for shipbuilders. Situated in a region rich in agriculture and mining, they have an outlet to the ocean through the Welland Canal and St. Lawrence Canal and River or down through the Illinois and Mississippi Rivers to the Gulf. Incidentally, it is interesting to note that shipbuilding kept up in the Great Lakes section with greater activity prior to the first World War than the coastal areas which keenly felt the pre-war mercantile marine decline.

On July 30, 1914, there were 2529 steam vessels on the Great Lakes. One hundred and thirty-one ships were built during the next twelve months, the first year of the first World War and from then on the Great Lakes responded to the call of American needs by working at full capacity during the entire gigantic conflict. Again, the traveler may observe that Duluth does not seem to offer many advantages to shipbuilders. It is icebound in the winter with a temperature running to forty degrees below zero and to add to difficulties it has limited launching facilities.

Her rugged Swedish and Finnish sons, however, have built up a remarkable shipbuilding tradition of their own here directly in the

As the lines were cut on the two vessels, relatives of the two Duluthians who died in the Japanese attack of December 7 were given memorial honors. In the picture above are shown Mrs. Catherine McQuade Berg, sister of Robert Cameron McQuade, who was killed aboard the destroyer "Shaw" in the attack on Pearl Harbor, sponsor of the "Mannington;" Mrs. Clem Moniak, daughter of Mrs. Catherine Walczynski; Mrs. Catherine Walczynski, who sponsored the "Tarentum," 80-year-old mother of Andrew Alloise Walczynski, killed in action at Hickam Field, Hawaii, December 7, 1941; Julius H. Barnes, president of Barnes-Duluth Shipbuilding Co.; and Admiral Harold L. Vickery, Deputy Administrator in charge of Ship Construction, United States Maritime Commission.

center of the North American Continent. They have so exercized their ingenuity that the Great Lakes today offers the cheapest transportation service in the world. Into such a country and such a tradition came, at an early age, the founder of the Barnes-Duluth Shipbuilding Company,

Though born in Little Rock, Arkansas, Julius Howland Barnes was educated in the public schools of Duluth. His brilliant career in the grain field makes interesting reading itself, but is overshadowed by the striking war record he created. Most are well acquainted with the significant role played by Mr. Barnes as President of the United States Grain Corporation and as U. S. Wheat Director, in World War I, a position to which he was appointed by President Wilson.

In his original capacity as a leading grain operator, Mr. Barnes realized at an early date that the problem facing American business was not production but distribution. As the essence of distribution is transportation, the latter question became the major one in maintaining the advancing American Standard of living. In a manner thoroughly indicative of his method of tackling problems, Mr. Barnes went after shipbuilding, in conjunction with his government grain work, with a minimum of fan-fare but a maximum of enterprise and hard work that achieved, in a short time, forty-four carriers of unusually efficient and economical design. This type has been utilized, with variations, by many concerns since then.

After the war, his splendid service was justly acknowledged by decorations from six of the allied countries and honorary degrees from Harvard, Dartmouth, Pittsburgh, and Syracuse Universities. His work for America far from through with the war's finish, Mr. Barnes again tackled the problems of American business and served as President of the Chamber of Commerce of the United States during the period of 1922 to 1924 and as Chairman of the Board from 1929 to 1932.

At the recent launching, we witnessed not only an extremely effective contribution to the United Nation's War effort, but viewed as well a valuable addition to America's merchant fleet that will continue to serve our people when peace has returned.

Unfortunately, at times it seems as though it takes a war or major emergency to arouse the interest of some of the country in their mercantile needs. In fact, to see the generally held attitude in 1917, we might quote the opening words of W. C. Mattox's preface to "Building the Emergency Fleet": "Nothing short of war with Germany served to arouse the American people and the government to the need of a merchant fleet." How true this sounds as applied to 1942! Once aroused, however, the American public fully responded in the last war to such an extent that the Emergency Fleet Corporation in a single year built and delivered more than 3,100,000 dead-weight tons of shipping—far more than the greatest output of any other nation in a single year up to that

In attendance at launching were, left to right: Tom W. Drennen, Manager, New York Branch, Fairbanks, Morse & Co.; Captain G. W. E. Mikkelson, Assistant to President, Barnes-Duluth Shipbuilding Company; and Arthur C. Dodge, Vice-President and Sales Manager, Fairbanks, Morse & Company.

Part of the group of more than 7,000 people who assembled in the yards of the Barnes-Duluth Shipbuilding Co. to witness the dual launching of the two tankers.

The U. S. M. C. Tankers "Mannington" and "Tarentum" ready for launching at the Duluth yards of the Barnes-Duluth Shipbuilding Company.

time. Modern steel ships between 3500 and 9000 tons, that formerly took from nine to eighteen months, were turned out in from thirty to 120 days. In one yard, the actual average time required to complete a vessel from keel laying to delivery was reduced to less than two and one-third months.

The wave of shipbuilding that swept from coast to coast can be reflected in the fact that we entered World War I with thirty-seven yards building steel ships and twenty-four yards building wood ships of more than three thousand deadweight tons. Eighteen month later, just prior to the Armistice, we had 216 shipyards and 970 ways being used for constructing new ships of this tonnage; 111 yards and 558 ways had been created after the declaration of war.

During this period Great Lakes Shipbuilding made a vivid and vital contribution. Many who entered it primarily as a war emergency measure, taken in stride with their regular war jobs, such as Mr. Barnes, closed their yards after the Armistice and turned to their original peace time pursuits. Now that the call has been sounded once more these same men have responded with even increased vigor.

The Barnes-Duluth Shipbuilding Company has determined to eclipse its first war record by building tankers such as were launched June 3rd in record time. All manufacturers contributing to these vessels are bending every effort to create this vital line of fuel carriers.

In one of the interesting talks delivered by Mr. Barnes during his term as President of the Chamber of Commerce, he stated: "But while we have demonstrated that, in America, we have made the world's most astounding increase in national wealth and established the world's most advanced standard of living, there still remains the test of whether we have lost anything of the inspirational value of the early ideals of this republic." The record of him and his associates today, in America's most difficult and historic period, is ample evidence that this value has not been lost.

With the launching of these initial tankers from the Barnes-Duluth yards, they cement the same patriotic vigor given in the last war to their stalwart efforts today.

No greater tribute to the spirit of America could be made than that included in the inspirational address of Julius H. Barnes, patriot, business man, shipbuilder and humanitarian, when he said at the recent launching: "A peaceful America of vast latent power is now producing a great tide of planes, tanks, guns and ships for a war forced upon it. American youth will have equipment of unequalled quality and efficiency. This war will be won by the forces of humanity, decency and orderly living."

"Sweep fast, Mr. Moto, America is aroused!"

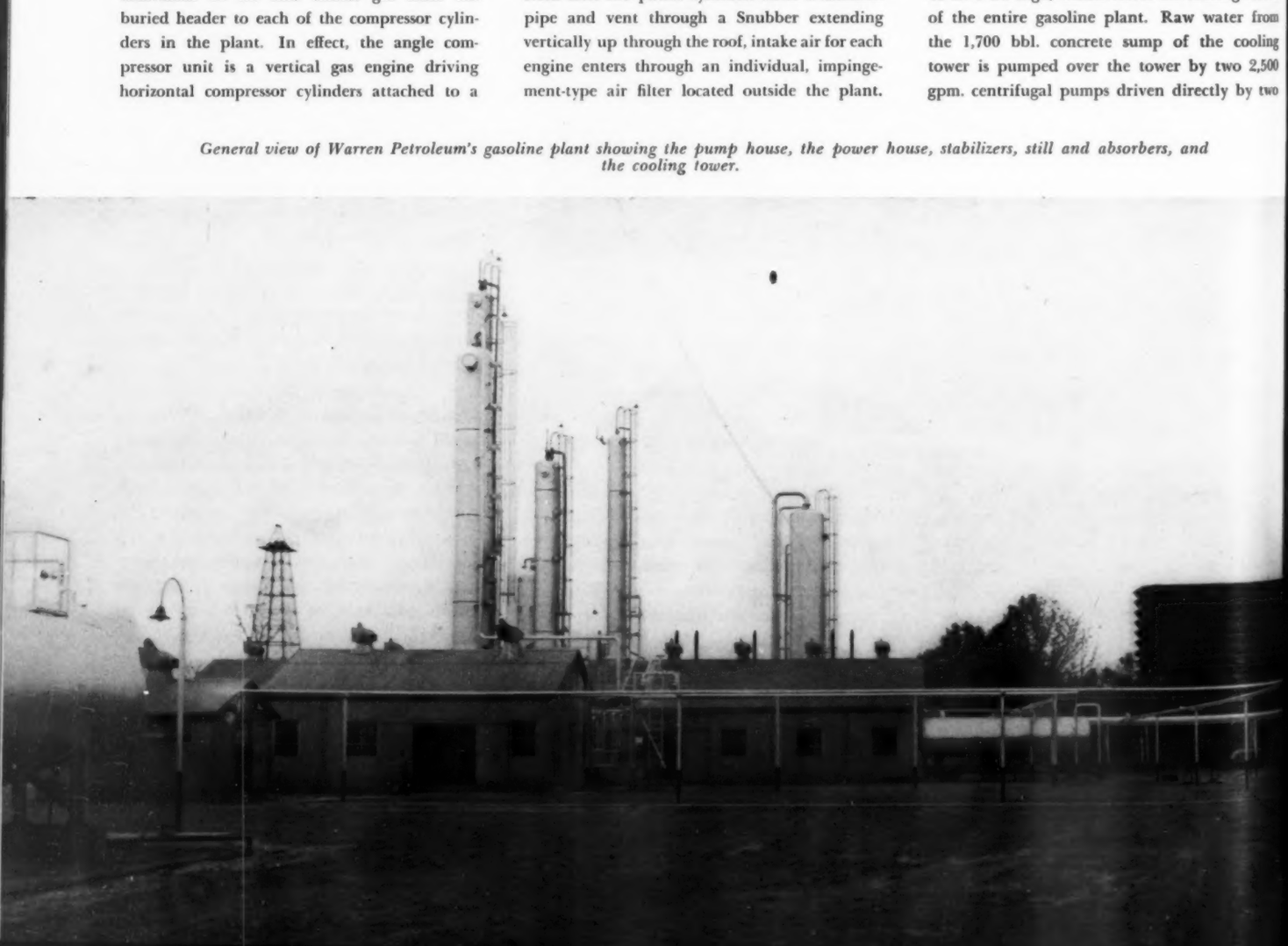
EFFICIENT GASOLINE PRODUCTION

DIVERSION of oil tankers from their regular routes from Gulf ports to Philadelphia, and the resultant gasoline shortage in the eastern states has caused oil fields and gasoline plants nearest the east, particularly those that ship their product by rail, to take on increased importance. Newest of the gasoline plants in the Centralia-Salem field is the Warren Petroleum Corporation's stripping plant in the northwest section of the field.

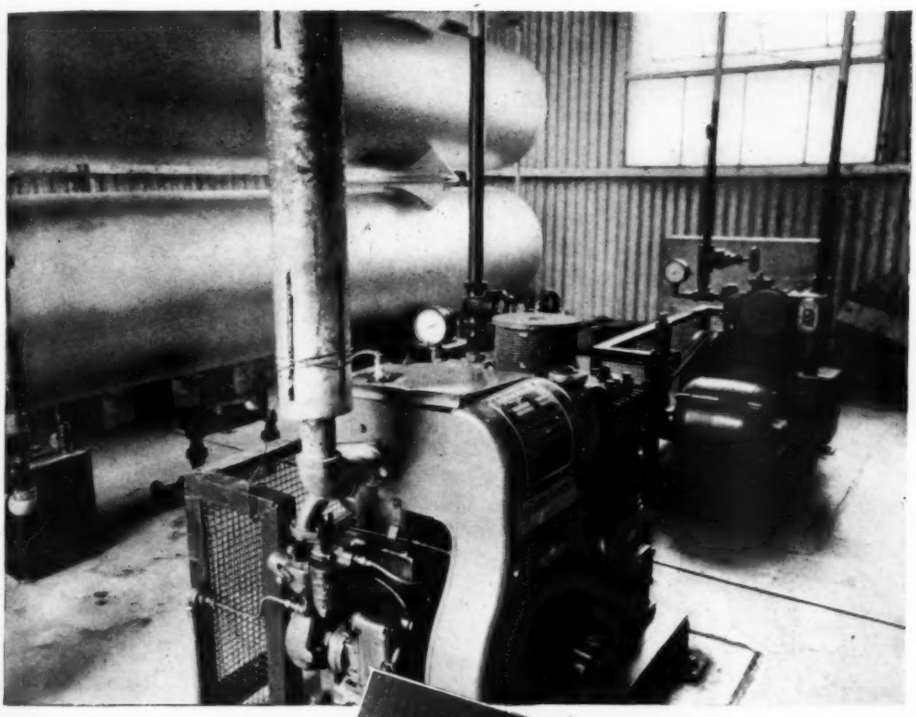
Handling 18,000,000 cu. ft. of casing-head gas gathered from 571 wells during each 24-hour period, the plant has recorded a daily production of 950 bbl. of gasoline, 20,000 gallons of butane, and 10,000 gallons of propane. The principal power job of compressing the incoming gas from a suction vacuum of nine inches to a discharge pressure of 40 pounds is accomplished by five 400 hp. Clark gas engine-compressor units of the modern angle type. Gas comes from the field through two gathering systems with a scrubber for each, to a 20 in. header connecting the two scrubbers. An individual 16 in. line carries gas from the buried header to each of the compressor cylinders in the plant. In effect, the angle compressor unit is a vertical gas engine driving horizontal compressor cylinders attached to a common crankshaft. Of the five 4 cylinder, 400 hp. engines in the plant, four drive two 27 in. by 14 in. compressor cylinders each. The fifth engine drives two 23 in. by 14 in. cylinders and a 10½ in. by 14 in. recompressor cylinder. The recompressor handles gas from the gasoline receiver tank, receiving it at 50 lbs. and discharging it at 200 lbs. pressure to a scrubber and stabilizer. Three factors promote the economy of this power installation: first, efficiency of the gas engine; second, elimination of loss in power transmission accomplished by the common crankshaft of the angle design; and third, the fact that denuded residue gas can be used as fuel. Gas from the residue line reaches the plant at approximately 20 lbs. pressure, passes through a regulator which reduces the pressure to 15 lbs., then enters an underground header at the back of the plant with a line to each engine. Gas enters each power cylinder at this pressure just after the exhaust ports have been closed on the compression stroke of the two-stroke cycle. Timely ignition is assured by a rotary magneto for each engine. Exhaust gases from each two power cylinders enter a common pipe and vent through a Snubber extending vertically up through the roof, intake air for each engine enters through an individual, impingement-type air filter located outside the plant.

All bearings are lubricated by oil under pressure, and pistons are cooled by the same supply of lubricating oil. Oil is drawn from the crankcase by a gear pump on the end of the crankshaft and is sent through a battery of five filters and a cooler before reaching the header that supplies the bearings. A mechanical, force-feed lubricator supplies oil to both power and compressor cylinders. To clean the crankcase oil, an activated clay reclaimer has been provided. This is arranged for by-pass operations on one engine at a time, taking oil from the discharge line of the main engine circulating pump and returning it after purification to the crankcase. This reclaimer serves each unit for a month, then is disconnected and moved over to the next engine on the line. Only steam condensate is used in the engine cooling system. To circulate this jacket water, each engine has a centrifugal pump driven by four V-belts from a pulley just outside the flywheel. Water is pumped through cylinder jackets and through one section of the large atmospheric type cooling tower, 197 ft. long, 24 ft. 4 in. wide, and 48 ft. 6 in. high, which serves all cooling needs of the entire gasoline plant. Raw water from the 1,700 bbl. concrete sump of the cooling tower is pumped over the tower by two 2,500 gpm. centrifugal pumps driven directly by two

General view of Warren Petroleum's gasoline plant showing the pump house, the power house, stabilizers, still and absorbers, and the cooling tower.



ROM ILLINOIS FIELD



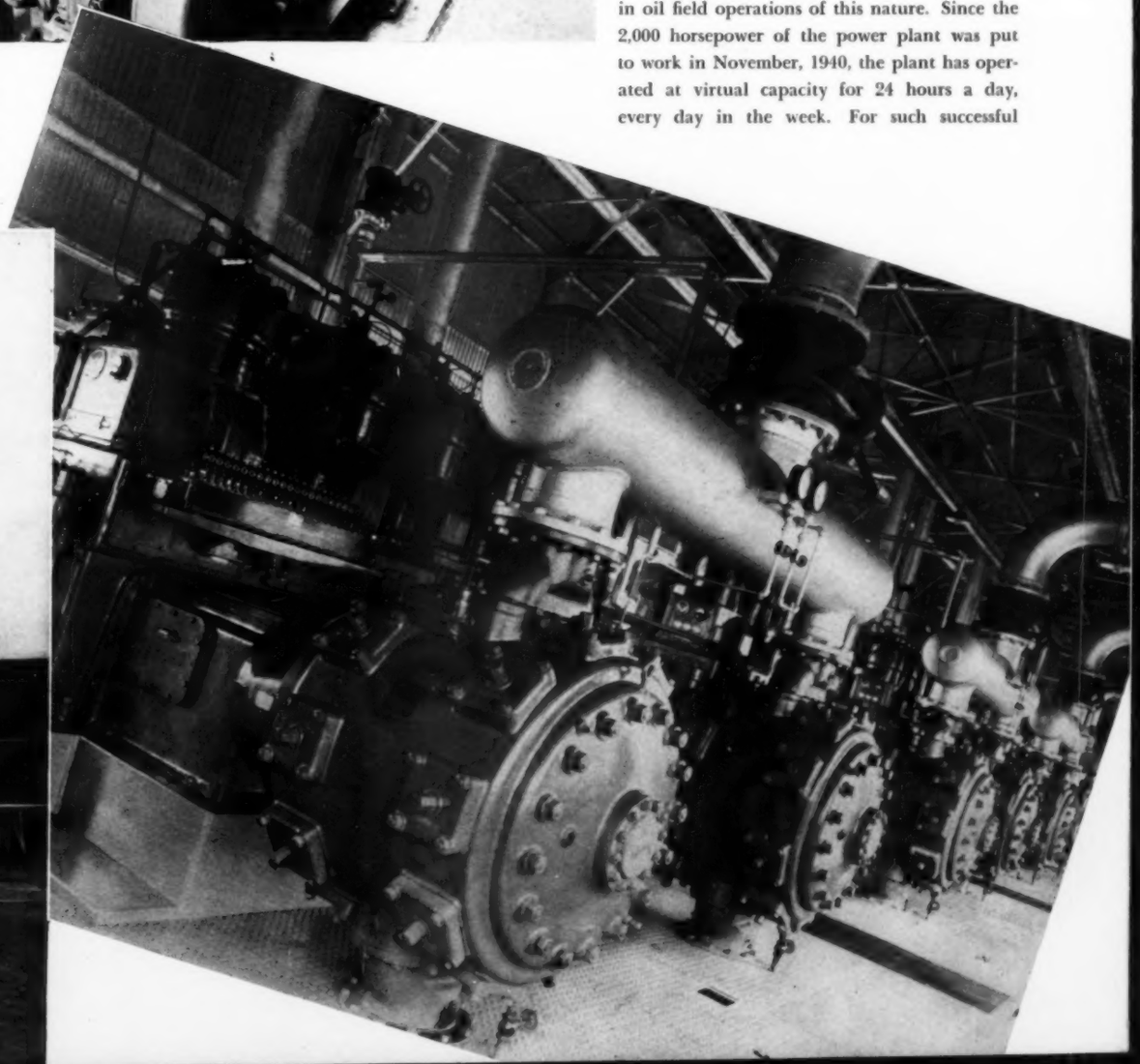
Gasoline Plant of Warren Petroleum in Centralia-Salem Field Produces Daily 1,000 Bbl. of Gasoline, 20,000 Gallons of Butane, and 10,000 Gallons of Propane.

By WILLIAM H. GOTTLIEB

40 hp. Buda natural gas engines. Makeup water is obtained from the Kaskaskia River twenty miles to the west. In the event of pump failure, water can be sprayed over the tower by an emergency gas-lift system.

Continuity of operation is second only to safety in oil field operations of this nature. Since the 2,000 horsepower of the power plant was put to work in November, 1940, the plant has operated at virtual capacity for 24 hours a day, every day in the week. For such successful

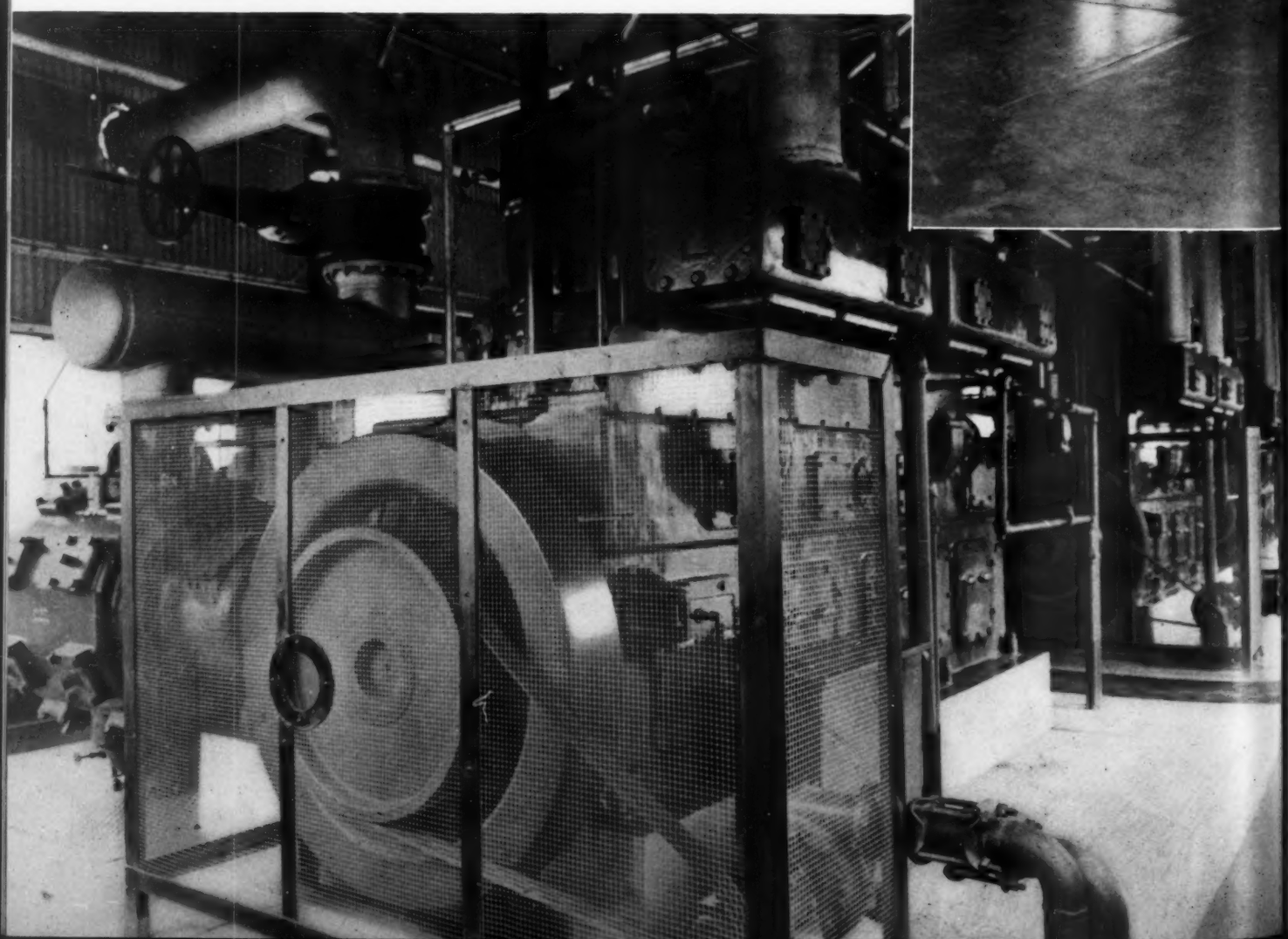
Above: Compressors supplying air for starting the engines. Right: Clark Brothers engine compressors totaling 2,000 hp. and handling 18 million cubic feet of casinghead gas each twenty-four hours.

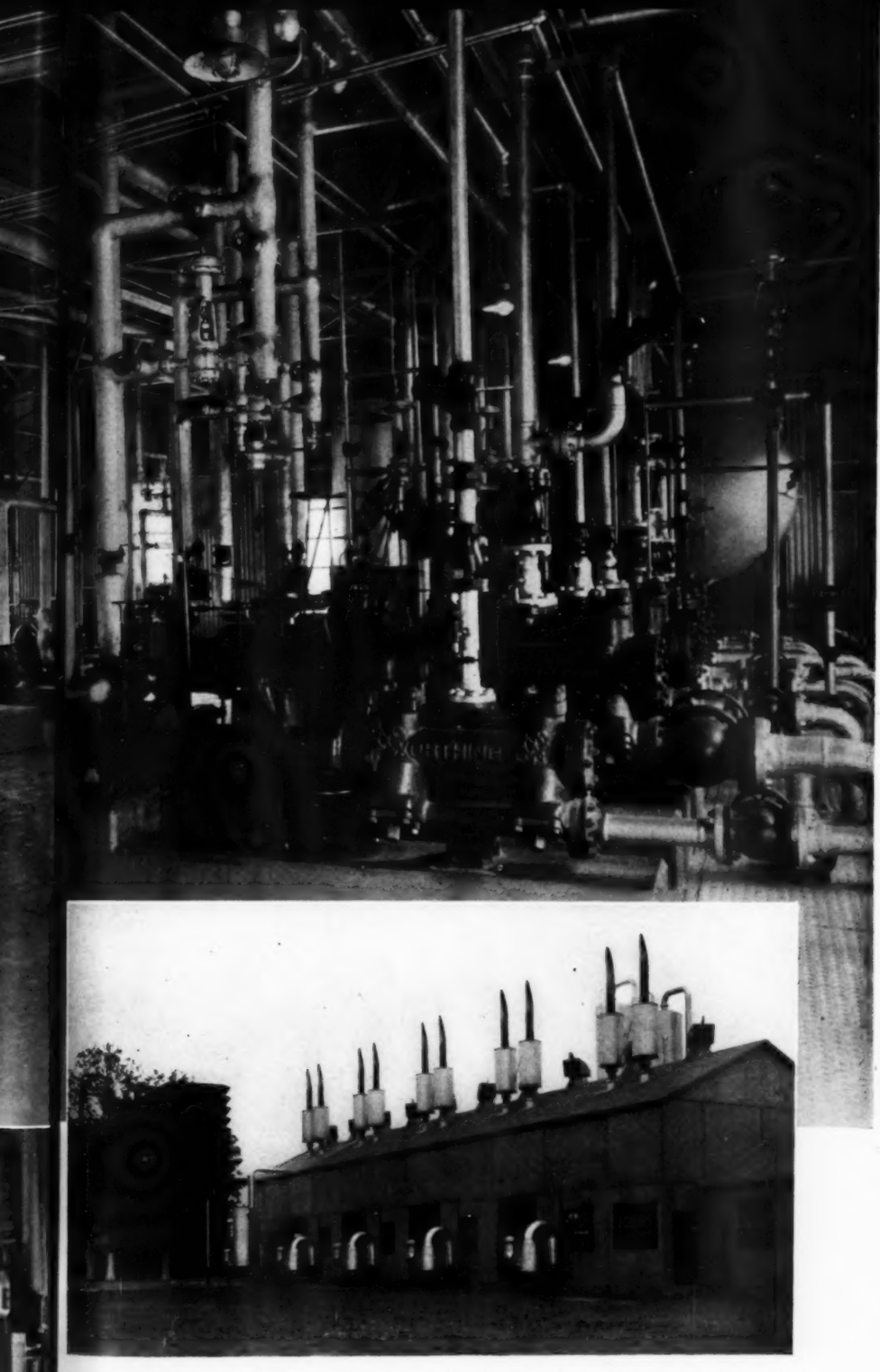


continuity of operation, engine conditions must be right. A gauge board on the end of each engine permits the operator to tell at a glance lubricating oil pressure and intake and outlet water temperatures. Oil pressure is kept at 30 lbs. Water enters the engine jackets at 160 deg. and leaves at 180 deg. A multi-point pyrometer on the gauge board allows a quick check on exhaust temperature at each cylinder. Even if the operator fails to catch an unhealthy condition, adequate safety devices have been provided to eliminate the possibility of serious damage. If lube oil pressure drops too low or cooling water temperature rises too high, the magneto of each engine affected is grounded automatically. In addition, there is a master switch outside the plant so that the operator can ground all the magnetos and stop the engines without entering the plant in case of a gas leak or fire. Engines are started by compressed air provided by two compressors, one driven by an electric motor and one by a gasoline engine.

Oil men will be interested in a somewhat more detailed outline of the gasoline plant set-up. After the entering gas is compressed to 40 lbs. and cooled in two sections of the tower, it passes through a 6 ft. by 10 ft. scrubber to two 7 ft. by 54 ft., 20-tray absorbers. Rich oil from the absorber is sent by a turbine-driven, centrifugal pump through tubes of a rich oil-lean oil heat exchanger and then through a steam preheater to the still. After stripping, the oil, now lean, passes through the shell of the same exchanger to a 3 ft. by 12 ft., horizontal, surge tank. A turbine-driven centrifugal pump forces the oil through six sections of the cooling tower and then back to the absorbers. Residue gas from the absorber passes through a scrubber to a 12 in. distributing header from which it enters the plant supply line, three 6 in. field fuel lines, and an 8 in. line to the City of Salem where the gas is used for domestic purposes. It is residue gas, of course, that is used for engine fuel in the power house. The still has sixteen operating bubble trays, a blank dehydrator tray and a mist extractor. Overhead vapors are condensed in three sections of the cooling tower and then flow to a reflux tank

Below: Water jacket pumps and clarifier such as are used on all engines in the plant. Right: Complex pumping needs of the gasoline plant are handled by the turbine driven centrifugal pumps at left and the reciprocating pumps at right.





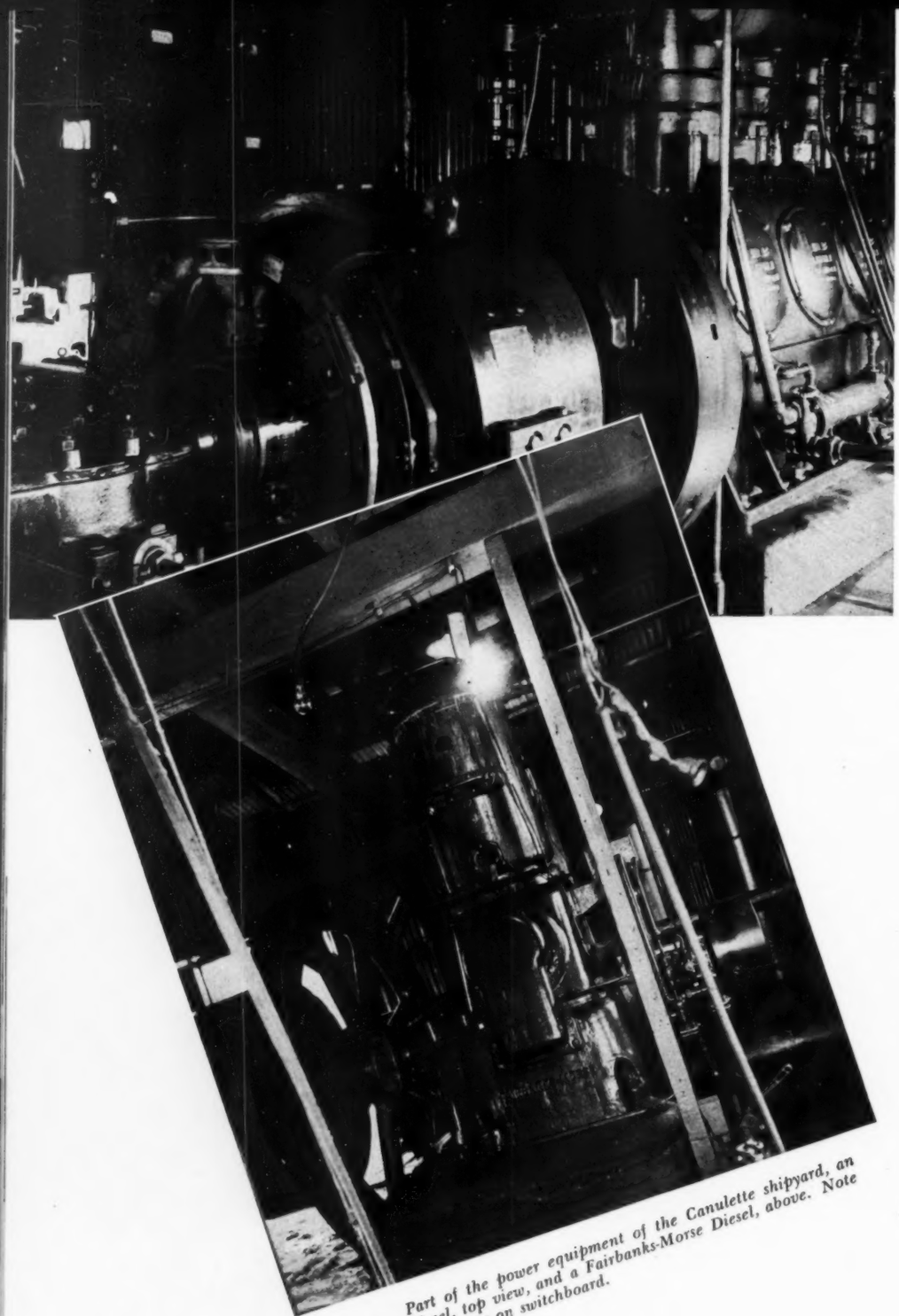
Power house of the Warren Petroleum plant housing the 2,000 hp. of Clark Brothers gas engine angle compressors.

from which reflux for the still is drawn by two duplex pumps. The gasoline product and vapors pass from the top of the tank through a section of the cooling tower to a 7 ft. by 30 ft. gasoline receiver. Uncondensed gases in the gasoline receiver pass through a 3 ft. by 10 ft. scrubber to the recompressor cylinder of one of the engines. The gases are compressed to 200 lbs., cooled and then delivered to a 3 ft. by 10 ft. scrubber. Condensate is pumped from this scrubber by a simplex pump to the second stabilizer while vapors are released to the residue gas header. Raw gasoline in the receiver is pumped through a heat exchanger to the first stabilizer by a simplex pump. This 4 ft. 6 in. by 66 ft. tower has thirty trays, and bottom heat is supplied by a reboiler using 250 lb. steam. Overhead in this stabilizer is condensed and used entirely for reflux which is handled by a simplex pump. Non-condensible gases in the reflux accumulator, mostly ethane, are released to the residue gas header. The bottom product exchanges heat with the charge, is cooled in two sections of the cooling tower and then passes to the treatment plant.

The de-ethanized gasoline is mixed with a 10 deg. caustic solution in a 5 ft. by 16 ft. tank with a motor-driven centrifugal pump to circulate the mixture. The gasoline then passes through a 5 ft. by 25 ft. horizontal settling tank and a 5 ft. by 14 ft. sand filter to two 5 ft. by 12 ft. reagent towers. Treated gasoline passes through a heat exchanger to the second stabilizer, a 4 ft. by 55 ft. tower with thirty trays and a steam reboiler. The bottom product is natural gasoline stabilized to the desired vapor pressure and this product exchanges heat with the incoming charge and passes through a section of the cooling tower to a storage tank. The overhead, a propane-butane mixture, is condensed in a section of the cooling tower. Reflux is handled by a simplex pump. Excess reflux from this stabilizer is sent by a simplex pump through a heat exchanger to the third stabilizer, a 3 ft. by 61 ft. tower with thirty trays. The overhead product is dehydrated in a tank containing calcium chloride and then goes to storage as commercial propane. A steam reboiler provides bottom heat for this stabilizer and a simplex pump is used to handle reflux. The bottom product of the third stabilizer is a mixture of iso and normal butane, and passes through a heat exchanger to the fourth stabilizer, a 4 ft. by 85 ft. tower with 50 trays and a steam reboiler. The overhead is condensed in a cooling tower section and used for reflux which is handled by a simplex pump. Excess reflux is stored as iso butane. The bottom product exchanges heat with the incoming charge, is cooled in a section of the cooling tower and passes to normal butane storage.

Non-condensible gases from the reflux accumulators of all four stabilizers are released to the residue gas header to be used as plant fuel or piped to Salem for domestic use.

There are ten 10 by 40-ft. horizontal tanks for gasoline storage, four 10 by 40-ft. horizontal tanks for butane storage, and one 7 by 30-ft. and two 7 by 40-ft. horizontal tanks for propane storage. Gasoline is pumped to a 10-car loading rack on the railroad near the plant, by a 300 gallon per minute motor-driven, centrifugal pump. A simplex pump delivers butane and propane either to the loading rack or to a truck-loading dock.



Part of the power equipment of the Canulette shipyard, an Atlas Diesel, top view, and a Fairbanks-Morse Diesel, above. Note Alnor pyrometer on switchboard.

DIESELS BUILD BOATS

By WARREN GLEASON

MANY of the busy shipyards establishing such excellent production records in the current emergency are finding operations to be materially enhanced by the use of Diesels in their own engine rooms. Such a shipyard is the Canulette Shipbuilding Company, Inc. of Slidell, Louisiana.

Slidell is a small Louisiana city situated about thirty miles northeast of New Orleans on the Southern Railroad. Formerly of great importance in the lumber industry, Slidell has now lost much of its lumber activity and must depend on other industries for payrolls. While there is an extensive brick and tile plant in sight, few passers realize that one of the South's best-known shipyards is also a Slidell institution. Slidell has no apparent waterfront, but across the tracks a mile or so away, Bayou Vincent with a fifteen foot channel leads directly into nearby Lake Pontchartrain. And on the banks of Bayou Vincent are the yards of the Canulette Shipbuilding Company, Inc.

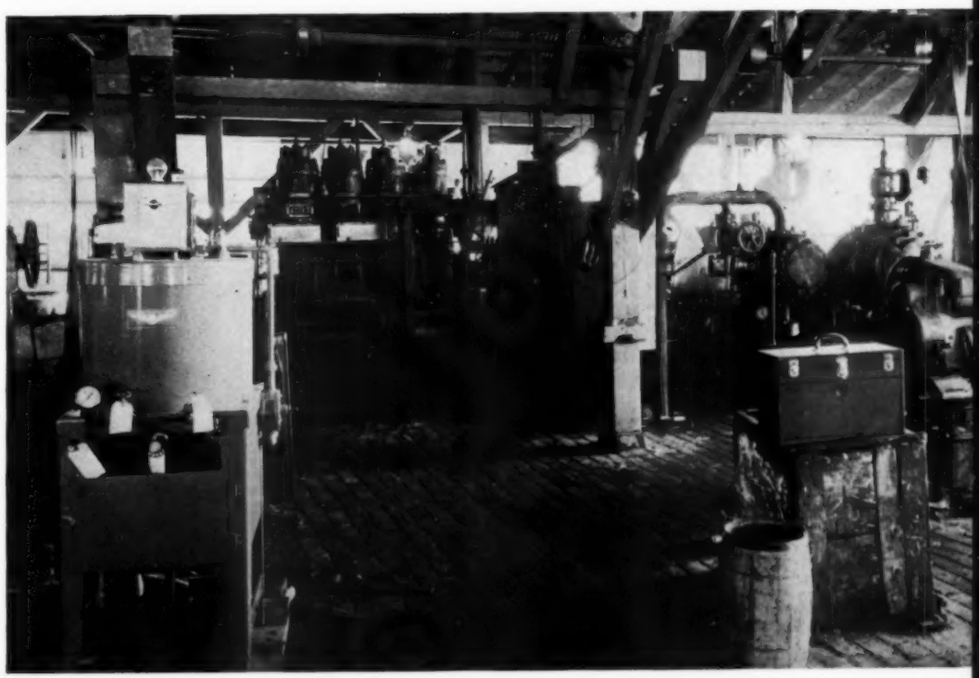
Founded in 1918, the firm is a family affair; Frank N. Canulette serves as president, A. D. Canulette, Jr., as Vice-president, with Mayo Canulette acting as assistant to the president.

In steady operation ever since its founding, the firm has made material progress, and many outstanding jobs of reconditioning and new construction have left these yards; among such jobs being the 110′ all-steel tug *Rowen Card*, featured in DIESEL PROGRESS in August, 1939; many Federal Barge Lines towboats have been reconditioned here, some of them being 250′ long. According to Mayo Canulette, "We can do anything to a boat that anybody else can do—all the owner has to do is just float it in here."

As practically all new construction and remodelling nowadays is steel work, welding plays an important part. Twenty-three arc-welding machines altogether are used in this plant, some of them Westinghouse and some Lincoln. Direct current from the firm's own Diesel generating plant is used; the Canulette Shipbuilding Co. is independent of other power sources.

Supplying the main portion of this current is the big Nelseco Diesel, rated at 420 hp. at 225 rpm., 450 at 230, and 550 at 250. This is a six-cylinder engine of 15″ bore by 22″ stroke, solid injection, air-starting and direct connected to a G-E generator of 320 amp. at 230 rpm., 115 volts DC. This engine and generator has been in steady service, from sixteen

Now generating current for the Canulette shipyard, this Nelseco Diesel previously saw twelve years in ferry service.



In the background, a 20-year-old F-M Diesel driving Worthington compressor, right. Seen left is the new Youngstown Miller unit to be installed for lube oil reclamation.

go twenty-four hours a day, ever since they were installed some eleven months ago, with only a few minor adjustments. While this service is of interest, it is not remarkable in itself as most modern Diesel plants can show equal performance. These last eleven months, however, are only a small part of the Nelseco's career. This Diesel was originally installed in a Diesel-Electric ferry in the State of Washington in 1929 and had already seen a dozen years of hard work when it was purchased together with the G-E generator by the Canulette firm.

Cooling is direct, for deep-well water is available at proper temperature. For lubrication, Texas "Arcade" oil is used, grade SAE 40, filtered by a DeLuxe Clear-Oil unit using four cartridges which are changed twice weekly.

As to fuel consumption, the Nelseco averages fifteen gallons per hour under full load, with a lube consumption of about two gallons a day.

Aiding the Nelseco in producing current is an Atlas Diesel of 160 hp. at 350 rpm., bought new from Arthur Duvic's Sons of New Orleans in 1938. Direct connected is a Westinghouse DC generator of 175 kw., 700 amps., 250 volts at 327 rpm. The Atlas is of four cylinders, 10½" by 18", using the Atlas common-rail fuel injection, and equipped with a Schutte & Koerting oil cooler; constant operation ever since installation offers proof of Diesel dependability in off-the-trail industries.

The Nelseco and the Atlas Diesels are the plant's workhorses and supply all the current for welding machines, lights, deep-well pumps, and for numerous heavy motor-driven machines such as lathes and drill-presses; one 30 hp. electric motor and one of 15 hp. turn the line-shafting in the shops; one 25 hp. motor powers the pump used for pumping out the drydock.

Stand-by power is also Diesel, four Fairbanks-Morse engines being installed. One of these, a one-cylinder 50 hp. at 150 rpm., was bought and installed twenty-three years ago in its present location. When used, it delivers its full power and will turn the whole line-shafting installation on three gallons of fuel an hour and a gallon of lube a day; belt-drive to the shaft is used.

There are three other Fairbanks-Morse Diesels, of which one—a two-cylinder 32D VA of 110 hp. at 360—is used to operate an emergency air compressor, an Ingersoll-Rand 12¼ by 12. Another, a Fairbanks-Morse C.O. of 4 cylinders delivering 100 hp. at 250, is a stand-by for the Worthington air-compressor in case of any failure of the 100 hp. electric motor used for ordinary operation.

Oil-filtering is centralized; a Youngstown Miller purifier services lube oil for all Diesels. The total capacity of this unit is eight gallons of filtered oil an hour which is adequate for the entire plant.

Among the jobs awaiting completion at the Canulette yards are the general repairs and engine overhaul on the Federal Barge Line towboat *Herbert Hoover*, 235 ft. by 45 ft., with twin Diesels of 2,000 hp.; repairing of the Standard Dredging Company dredge *Diesel*, 150 ft. overall length with 1800 hp. McIntosh and Seymour Diesels; a new all-steel ferry to have a pair of 500 hp. Cooper-Bessemer Diesels, is being built for New Orleans; new construction is also being done for the Government.

DIESELS FOR 29 YEARS

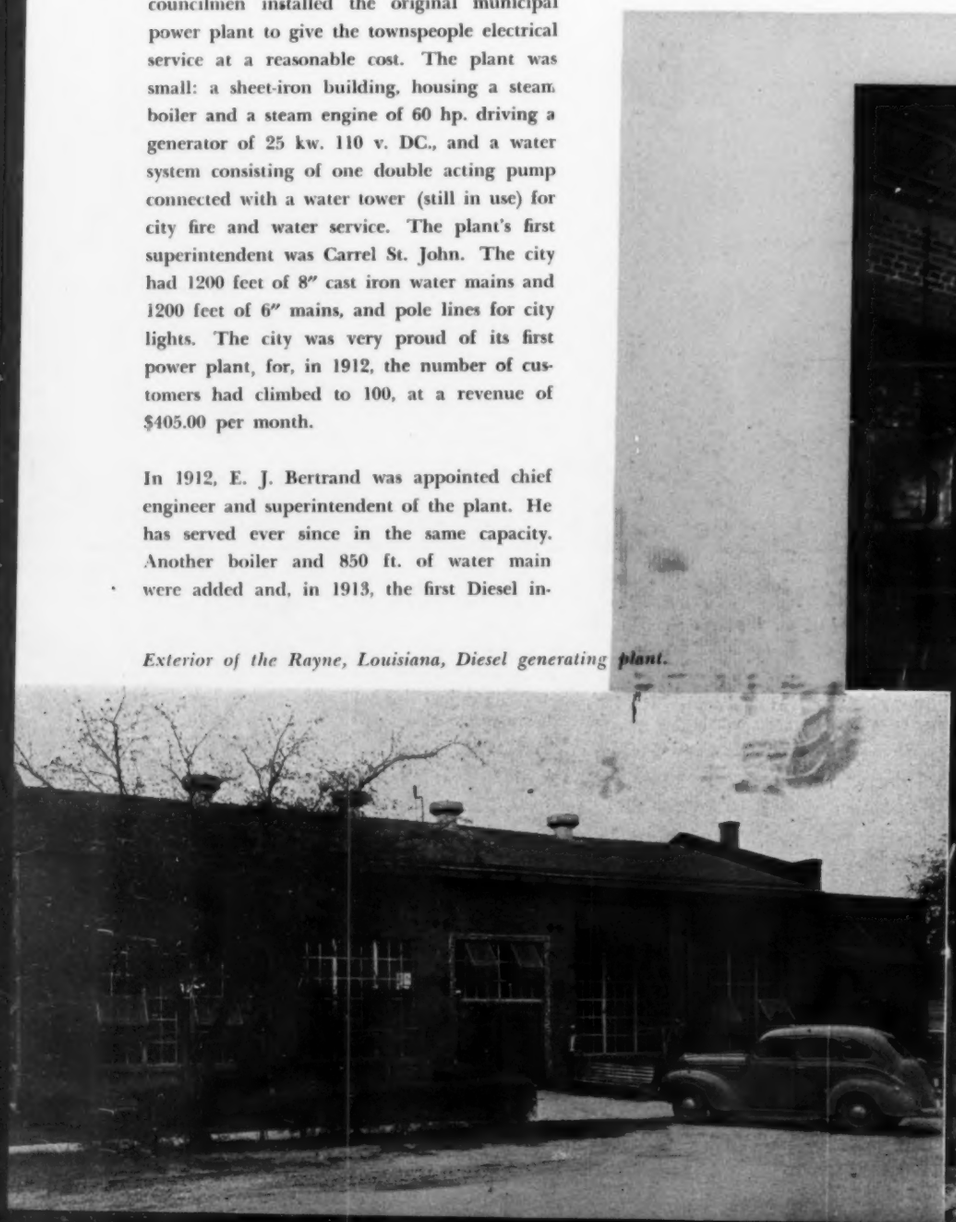
By WARREN GLEASON

RAYNE, Louisiana, in the southern part of the State, is another of those interesting little American cities, rich with the background of romantic history and, at the same time, it is aware of today's progress and opportunity. Rayne's civic leaders have always had at heart the welfare of their community, and they have been determined to give their townspeople all of the conveniences, services, and economies of modern life which are expected in larger centers of population but have not always been available in the smaller localities.

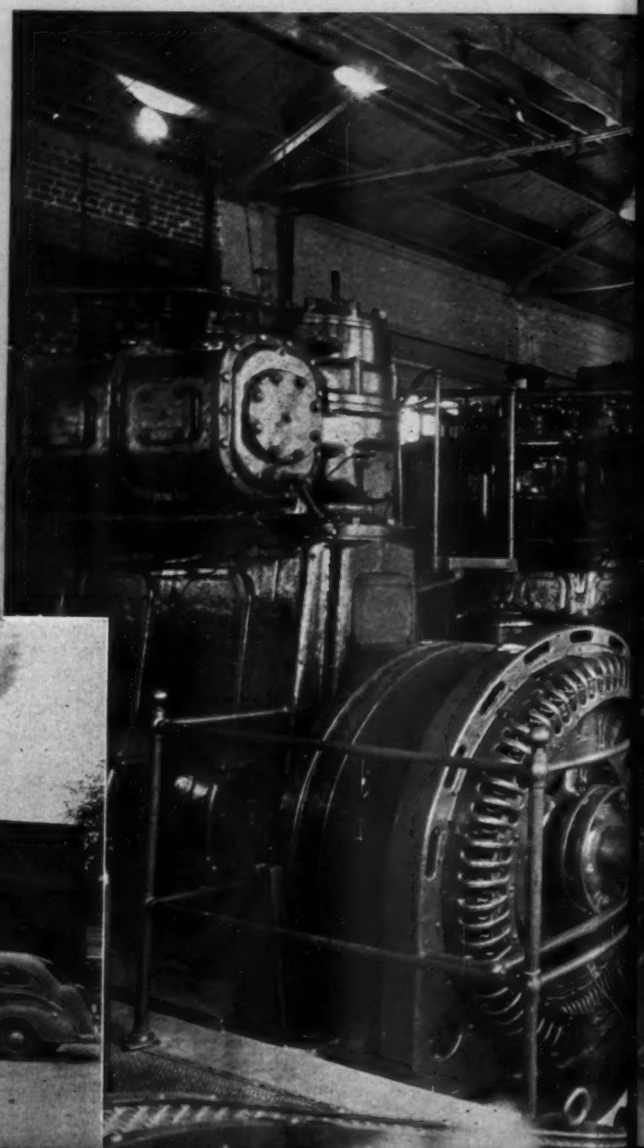
Back in 1902, Mayor O. Broussard and the city councilmen installed the original municipal power plant to give the townspeople electrical service at a reasonable cost. The plant was small: a sheet-iron building, housing a steam boiler and a steam engine of 60 hp. driving a generator of 25 kw. 110 v. DC., and a water system consisting of one double acting pump connected with a water tower (still in use) for city fire and water service. The plant's first superintendent was Carrel St. John. The city had 1200 feet of 8″ cast iron water mains and 1200 feet of 6″ mains, and pole lines for city lights. The city was very proud of its first power plant, for, in 1912, the number of customers had climbed to 100, at a revenue of $405.00 per month.

In 1912, E. J. Bertrand was appointed chief engineer and superintendent of the plant. He has served ever since in the same capacity. Another boiler and 850 ft. of water main were added and, in 1913, the first Diesel installation was made: a 60 hp. Snow-Worthington engine connected to the same old generator. According to "Eddie" Bertrand, when the plant was put under his management, it was losing from $200 to $400 a month; within a few months after the Diesel was put to work, the score was changed from loss to profit and the plant became self-supporting. In 1918, the city system was converted to alternating current, 3 phase, 60 cycle, 2300 volts, with the installation of a 140 hp. Snow-Worthington Diesel and a GE alternator. The cost was defrayed by a $25,000 certificate of indebtedness and $25,000 cash, both paid by utility revenue.

In 1922, there was further progress, for the plant was making money and the load demand was increasing: 600′ of 8″ mains and 20,000′ of 6″ were added to the water system; a new building was designed and erected for the plant and two 200 hp. Worthington Diesels were installed, a $95,000 bond issue financing the deal. In 1929, another Diesel was added: a McIntosh & Seymour of 500 hp. at a cost of $45,000 paid out of plant revenue. In 1939, the plant was again enlarged through a WPA project and a certificate of indebtedness of $80,000 against plant revenue. Two General Motors Diesels were added to the battery of engines;



Exterior of the Rayne, Louisiana, Diesel generating plant.

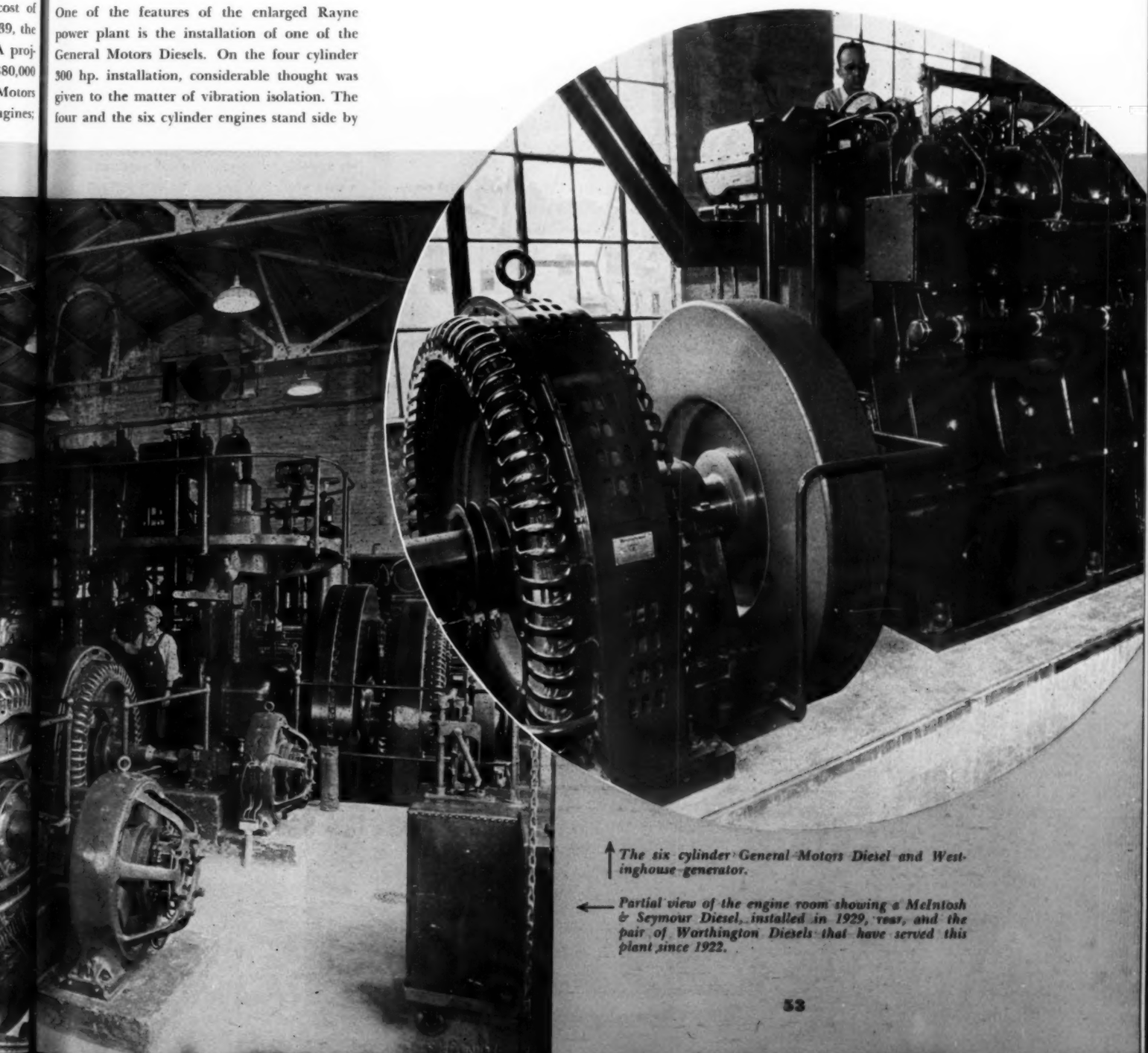


one of 6 cylinders, 450 hp. at 327 rpm., direct connected to a Westinghouse generator of 375 kva., and one of 4 cylinders, 300 hp. at 327 rpm., turning a 250 kva. Westinghouse. A new Westinghouse switchboard was also installed at an approximate cost of $10,000. It is of record that this $80,000 was borrowed from the bank at an interest rate of 4%, and that plant revenue is more than keeping ahead of the payments on this note; also that besides retiring this indebtedness, the plant is also paying $500.00 a month into the city treasury. The city's confidence in the recommendations of L. A. Voorhees, consulting engineer of Baton Rouge, La., under whom the additions to the plant were made, and in the demonstrated ability of Eddie Bertrand, is being rewarded.

One of the features of the enlarged Rayne power plant is the installation of one of the General Motors Diesels. On the four cylinder 300 hp. installation, considerable thought was given to the matter of vibration isolation. The four and the six cylinder engines stand side by side at the end of the engine room. Both these engines are usually operated at the same time, carrying the bulk of Rayne's demands; the two Worthingtons are cut in at peak loads, and the 500 hp. McIntosh & Seymour is used also at unusually heavy loads.

The 4-cylinder General Motors engine is mounted on a Hussman spring base. According to Eddie Bertrand, the concrete base for this Diesel is in two sections, a bottom layer and an upper layer, each layer about three feet in thickness. Between these two layers, which are independent of each other, the Hussman springs are interposed, half a dozen along each side with another at each corner. The huge upper base, a solid block of reinforced concrete, rests accordingly upon an absolute spring suspension. "What good is it?" the writer asked of Eddie Bertrand. "Invaluable!" was the answer. "You see, these two General Motors Diesels, one a four and one a six, are side by side and are frequently operated simultaneously. The spring suspension renders the two independent of each other so far as critical vibration periods are concerned; the frequencies of one engine cannot 'build up' with those of the other engine."

Both General Motors Diesels are equipped with Woodward governors and Coppus air filters, the latter are set in the tops of windows in the outside wall and get their air direct from inside the building. Large pipes take the air



The six cylinder General Motors Diesel and Westinghouse generator.

Partial view of the engine room showing a McIntosh & Seymour Diesel, installed in 1929, rear, and the pair of Worthington Diesels that have served this plant since 1922.

from the filters direct to the intake manifold. Harrison oil coolers are used, and Powel thermostatically controlled water-temperature regulating valves. The engines are also fitted with a thermostat-controlled alarm system for lube and cooling water failure.

Lubricating oil for all engines is refined by a De Laval Centrifuge, one machine handling all five Diesels. Lube oil changes are seldom necessary, according to Mr. Bertrand. The fuel oil system is also centrally protected by use of a Goulds Hydroil purifier. This unit also includes, for fuel transfer, a Goulds pump driven by a 1½ hp. Westinghouse electric motor. There are two main fuel tanks, one of 200 barrels and one of 300 barrels, with a day tank in the engine room for each engine.

Air-Maze filters of the oil-bath type are features of the twin Worthington Diesels, along with Schutte & Koerting oil coolers and Richardson Phoenix lubricators. Another Air-Maze filter is mounted on the big McIntosh & Seymour air compressor, with yet another Air-Maze protecting the one Worthington 3½" by 7" compressor, equipped with automatic pressure switch, which supplies the starting air for the 2 Worthington and 2 General Motors Diesels.

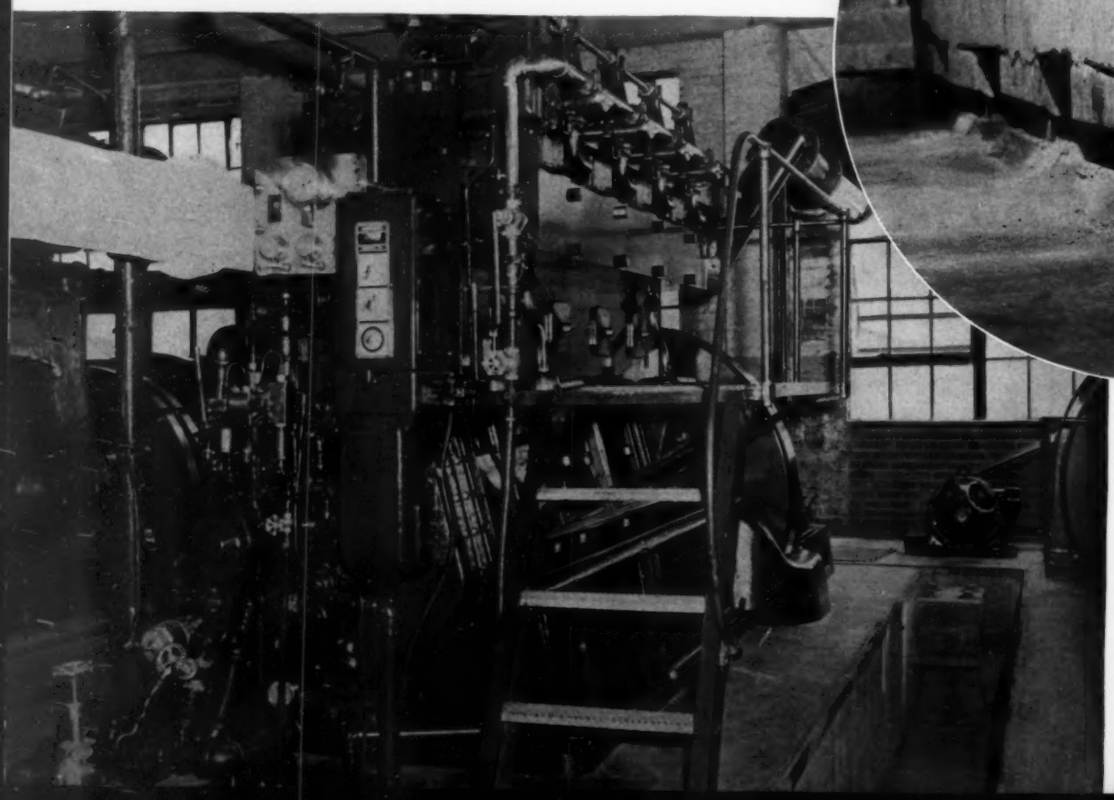
Cooling systems for all the Diesels are unified. Two sets of Fairbanks-Morse motor-driven centrifugal pumps, one pair of 250 gpm. and one pair of 300 gpm., all with full automatic control, pump the water from the cooling tower to the engines, from the engines to the hot well holding about 500 gallons, thence back to the cooling tower. Pumps start automatically when the hot well is full, to prevent overflow.

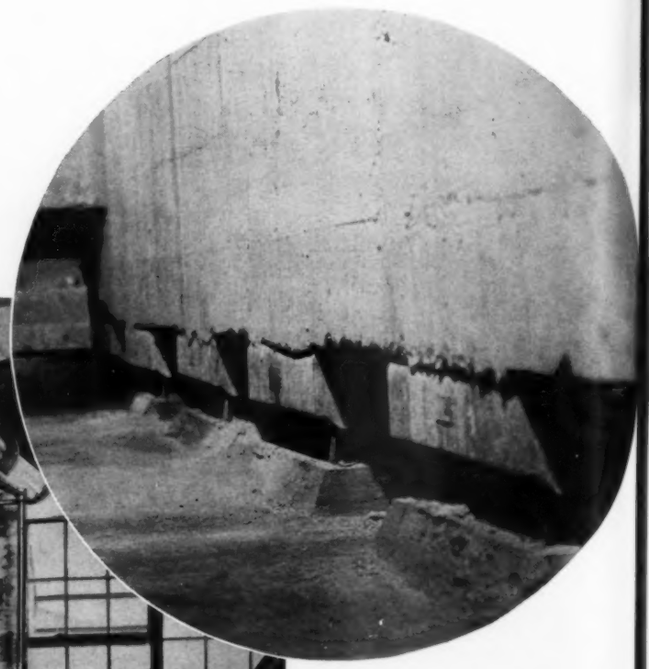
The McIntosh & Seymour Diesel, with its air-injection fuel system, has its individual air-compressor, an automatic unit maintaining 1,000 lbs. pressure. Installed with its 350 kw. 2300 volt 3-phase 60 cycle General Electric generator, in 1929, this 5-cylinder (17" x 24") 500 hp. at 200 rpm. Diesel has been a very consistent performer, according to Mr. Bertrand, and exceedingly economical as to lubricating oil. Texaco Ursa lube oil has given excellent results. Fuel injection of the 200 hp. 327 rpm. 4-cylinder, 12½" by 13¼" Worthingtons is mechanical, Blake-Knowls type, made by the Blake-Knowls Works of the Worthington company. The General Motors Diesels use the GM built-in mechanical high-pressure fuel pump.

Rayne is now a city of slightly over 5,000 population. The municipal power plant supplies all the current used for city, business and individual electric lighting. About 150,000 kw. per year is supplied to the city sewage disposal plant. Power is also supplied to the city's water system, for pumping water from the reservoir to the fire and drinking water mains.

As to details of the Diesel operation of Rayne, generating cost of current delivered to lines was .0131 per kw., with 1,359,050 meter kwh. Cost of water delivered to consumer, including pumping and distribution costs, was .0947 per M. Total electric current cost including production and distribution, was .02312 per kwh. The city has a profitable business on its hands, thanks to far-sighted citizens, competent engineers, and Diesel operation. Rayne is a good, neighborly place to live in. Incidentally, Superintendent Eddie Bertrand is as conscious of his duties toward his fellow-men as he is of his responsibility for the city's power plant. On the walls of his office hang two framed certificates: One of these attesting that he is District Chairman of the Evangeline Area, Boy Scouts of America, the other appointing him an Honorary Citizen of Boys' Town. Rayne has made no mistake in its power plant superintendent; a man who takes care of the kids will take care of the machinery.

In this end view of the General Motors 4-cylinder Diesel appears the Woodward governor and, to the right, the floor plate is removed to show the spring-mounted sub-base.





Above: Detail of the Hussman spring units under the Diesel, shown left.

DIESEL RESCUE VESSELS

On May 21 at the Defoe Shipbuilding Company yards at Bay City, Michigan, a U. S. Navy mine sweeper and submarine chaser, and a British Rescue Vessel were launched with triple ceremonies in which the above gentlemen participated: left to right, R. K. Evans, Vice-President of General Motors in charge of the General Engine Group; Capt. A. Loring Swasey, in charge of the sub-chaser construction program of the U. S. Navy; George W. Codrington, Vice-President of General Motors and General Manager of the Cleveland Diesel Engine Division which supplies half of all the Diesels going into United States Navy vessels; H. J. Defoe, President of the Defoe Shipbuilding Company which is turning out a GM-Diesel-powered PC subchaser for the U. S. Navy every seven days; and Lieut. Commander R. L. Greenstreet of the British Royal Navy who is in charge of the British Rescue Vessel construction program in this country.

Mrs. William M. Defoe, wife of a Great Lakes shipbuilder, christening the British Rescue Ship "Bold."

Here's the launching of the "Bold," a kind of warship that seldom gets its name in the papers, let alone its picture. She is the latest of the fleet of British Rescue Vessels being built in this country on contract by General Motors. GM supplies the Diesel engines and other propulsion machinery and the boats are built on sub-contract by various American shipyards. These vessels can tow anything from a fishing boat to a battleship. Vessels in this service have rescued more than two million tons of United Nations shipping since the war began, shipping that might have gone down but now lives to fight another day.

DIESEL TUG "H. B. MORTIMOORE"

THIS smart, streamlined Diesel tugboat is unusual in construction as well as appearance. The hull, measuring 65′ long, 17′ wide, and 6′ 9″ deep, is fabricated of all welded Byers wrought iron and was built by Robius Shipbuilding and Welding Company, Delanco, N. J., from designs by J. Murray Watts, Philadelphia, for the American Dredging Company.

The arrangement shows a forepeak tank and chain locker; aft of this is the crew's quarters with four pipe berths, and a ladder leading from on deck. The pilot house is over this. Next, on the starboard side, is the Captain's stateroom and bathroom. To port is the galley, fitted with an oil burning range, refrigerator, and sink with hot and cold water. Below decks are the fuel tanks, with a capacity of sixteen tons, which run the full width of the boat. Next to the oil tanks comes the engine room, 21′ x 17′. In it is installed the fresh water cooled main Diesel engine, the auxiliaries, the air tanks for maneuvering, the oil heater for the radiators, the generator and main switchboard, the oil centrifuge and the spare pumps.

On deck the tug has a distinctive appearance because of the streamlining of the deck house and especially good visability is obtained due to this from the pilot house, both forward and aft. The boat is kept in perfect trim by water tanks in the peaks, regardless of how full or empty the fuel tanks may be.

She is powered by a 240 hp. Fairbanks-Morse Diesel engine serving a three blade cast steel wheel, 58″ x 28″. For auxiliaries she has a 2¾ kw. 110 volt generator driven by a Fairbanks-Morse, 1 cylinder, Diesel engine located on the starboard side. In addition, she carries an auxiliary outfit consisting of an air compressor and a 3″ fire and bilge pump.

The main Diesel exhausts to a Maxim Silencer in the stack through two 8″ Penflex flexible pipes, and there is a smaller Maxim Silencer in the stack for the exhaust of the auxiliary Diesel engine.

Just forward of the engine room is a fuel tank holding 16 tons of oil. The water is carried in forepeak and afterpeak tanks; including a 225 gal. supply of drinking water. Lubricating oil is in a 4′ x 3′ tank. Sanitary water is in a 4′ x 3′ x 1′ tank with sanitary pump.

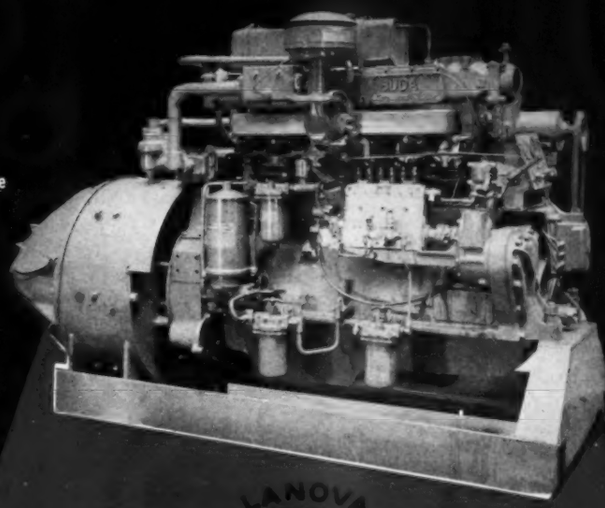
The streamlined, welded, wrought iron tug, "H. B. Mortimoore."

Inboard elevation and plan of the machinery space.

BUDA-LANOVA

Diesel-Electric Generator Sets

FOR MARITIME COMMISSION SHIPS

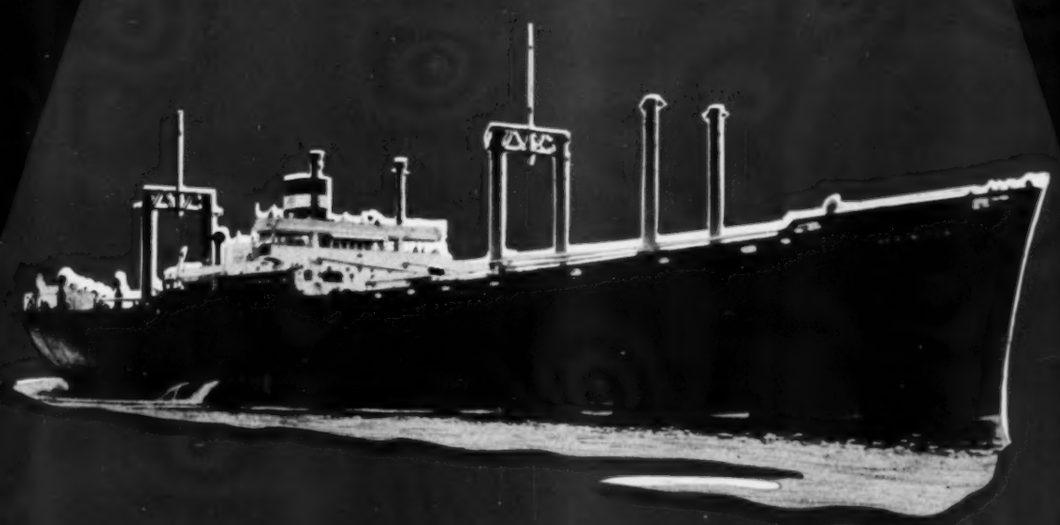


uda-Lanova Diesel-electric generator sets are erforming an important duty aboard many of hese new ships, by providing emergency light- ng and auxiliary power service. Built as packaged" units in sizes from 10 kw. to 00 kw. output, these rugged plants incor- orate all of the advantages in design nd construction gained in over thirty ears of engine manufacturing ex- perience. Write for full details cov- ering Buda-Lanova low cost power.

As compared to other Diesel engines, the Lanova combustion system as used in Buda Diesels makes possible lower compression ratios — lower maximum cylinder pressures — greater capacity for supercharging — higher mean effective pressures — less weight — lower rate of pressure rise — smoother, quieter operation — lower exhaust and piston temperatures and cleaner combustion — all of which produces higher efficiency, lower costs and *more horsepower hours per dollar!*

LANOVA

"THE HEART OF THE ENGINE"



THE BUDA CO.

HARVEY • CHICAGO SUBURB • ILLINOIS

DIESEL FUEL OILS

By R. L. GREGORY*

MUCH consideration should be given by Diesel Engineers to the subject of fuel oil for their plants. By purchasing an oil suitable to your particular type of engine, over one which is not suitable, will result in two sources of saving. First, your Diesels will operate more efficiently and, second, a suitable grade of fuel will cut your maintenance costs. Often you are justified in paying a premium for good oil by the savings effected in maintenance costs. There are three sources of fuel suitable for the average Diesel consumption. These consist of products ot recirculation from a cracking plant, straight distillate and crudes. Crude oils have not been used so extensively in the past, but at present, due to the demand for other types such as straight distillate, more crude is being used. An engineer should know the characteristics of the crude oil he uses, however. Certain crudes contain a high percentage of wax, which in some types of Diesels will tend to clog piping, atomizers, etc. Some types of engines, through design, are more susceptible to this clogging than others.

Other foreign elements such as sulphur compounds are often found in excess in some crudes. These should be avoided and, under any circumstances where a crude oil is used, the oil should be well centrifuged or cleaned. Straight-run oil is a highly desirable fuel, as it contains all the characteristics which make for economy and efficiency in operation, but, of course, the cost enters into this picture. It is highly desirable in high speed units, however, as oil obtained from recirculating sources of cracking plants will function satisfactorily in the slower speed units. Straight run fuels do not contain as high a percentage of carbon as do some of the other oils and this is an advantage of straight-run fuel over the others. Many plants use Bunker C oil, which has in the past, been the cheapest fuel obtainable. In order to use Bunker C oil, certain definite procedures must be followed; since it is a heavy oil, the flow point very high, and it contains considerable silicate and carbon. This, of course, necessitates a thorough centrifuging and so that it may be used to advantage in air-injection units, it must be preheated. This oil is difficult to handle in cold weather, due to its heavy consistency, and it will solidify very easily under subnormal temperatures. In solid injection engines of slow speed, it does not need to be preheated to as high a temperature as it does on the air injection Diesel.

Another feature to be reckoned with in the use of Bunker C oil is the cost of replacement parts, since pistons, liners, and rings show considerable more wear where this fuel is used than where higher grades of fuel are burned. The Diesel industry has made quite a survey of the fuel problem and has set up certain standards for various types of Diesels. Most Diesel manufacturers will also specify certain fuels and grades for use in their product, but these vary quite extensively and, consequently, most refiners and fuel oil vendors have endeavored to blend fuels to get one which will meet the reqiurements of the greatest number of engines.

In this connection, fuel dealers have met with many problems. Due to the ever changing designs, especially during the last year where the manufacturers have had to use substitute materials and redesign the fuel apparatus, they have been a little lax in their fuel specifications. With a greater demand for fuel, you may find some vendor pawning off fuels on you which are not suitable. If you are operating a high speed unit, you may find that even a highly refined oil of improper viscosity will give you plenty of trouble.

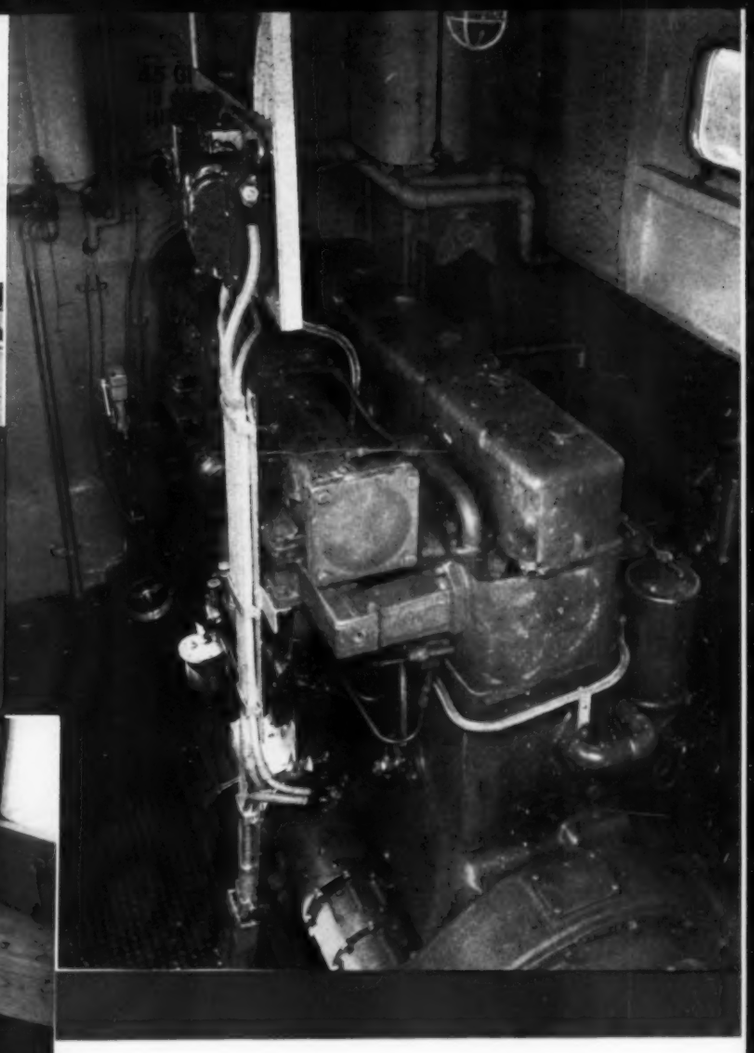
The average Diesel engineer has no definite way of knowing what a certain fuel will do in his engine until he tries it, unless he has the assurance of the manufacturer that a fuel of certain characteristics is suitable, and then he must depend upon the dealer to supply him with a fuel based upon such standards. A periodical checkup with the vendor on the characteristics of the fuel he is supplying would not be out of line, and he should be willing to cooperate in supplying the fuel with characteristics suitable for your operation. I have in mind a certain plant which has been buying fuel from the same vendor for years. Within the past few months, their engineer was complaining about engine knock and the subject of fuel came up. Investigation showed that while to all apparent signs he was receiving the same fuel he had been using in the past, the truth of the matter was that the characteristics had been changed and he really was getting a lot more carbon content than he previously had experienced.

Another engineer recently told me that he had been finding considerable water in his fuel of late. Perhaps these are exceptions to the rule, but they are all points every engineer should watch, especially under the present condition of fuel supply. The proper atomization of fuel depends upon the viscosity of the fuel, which varies inversely with temperature. The colder the oil, the more sluggish it becomes, and the harder to atomize properly.

Efficient operation of any unit depends a great deal upon proper atomization. With this in mind, the engineer should have periodical viscosity tests of his fuel. He may not have the equipment to make a viscosity test, but there are laboratories all over the country where he can easily obtain this information by sending in samples of his fuel if he is doubtful of the characteristics.

The American Society for Testing Materials will furnish you with their standards for Diesel fuel oils and it is handy information for any Diesel engineer. This, with the recommendation of the manufacturer as to the fuel suitable for your particular Diesel, should give you a pretty fair idea of what sort of fuel you should burn to get the most efficient results. The ignition point of your fuel is another important item to be checked. This will also be supplied by the laboratory making your test, but it is agreed almost universally that the best results can be obtained from actual engine tests on this point.

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*



EQUITABLE BUILDS SMALL ONES, TOO

By WARREN GLEASON

Above: The all steel tug "Maj. George W. Armitage", 55 ft. 3 in. long overall. Extreme right: The Buda 154 hp., 800 rpm., propulsion engine and Twin Disc reduction gear. Right: Pilot house view showing Bendix remote engine controls.

LITTLE boats, as well as big ones, are necessary in the present emergency. And small boats must be just as well built as the bigger ones to win U. S. Army approval. And many small craft continue to slide down the ways to take their place in the big parade. Among recent deliveries to the Quartermaster Corps is the fine all-steel tug *Maj. George W. Armitage.*

In accordance with recent practice, this tug bears a full coat of dull-colored war-paint and is shorn of embellishment. No brass letters designating boat's name and hailing port adorn the stern; no trim name-plate shines on the topsides; even the bow is without an identifying mark. The memory of Major Armitage must wait until after the war to be honored by his tugboat namesake, except in the files of the builders and of the Quartermaster Corps, United States Army.

This latest little Army tug is a sturdy vessel, measuring 55 ft. 3 in. overall, 17 ft. 3 in. in beam and 4 ft. 6 in. draft. Besides winning Army acceptance, the tug has the approval of the Bureau of Marine Inspection and Navigation, an award seldom made to a ship of so limited dimensions and tonnage.

Like the steel tug *Maj. John A. King,* delivered last year to the Army, this new boat was designed and built by Equitable Equipment Company, Inc., of New Orleans, at the firm's Shipbuilding Division yards on the Tchefuncta River at Madisonville, Louisiana. This spot in Louisiana, by the way, is old in the history of National Defense; back in 1814, one of the country's first Navy Yards was located here and a frigate was under construction at the time of the British invasion attempt at New Orleans.

A Buda Diesel powers the *Maj. George W. Armitage.* Maximum laboratory performance of this model is listed as 248 hp. at 1100 rpm. In the *Armitage,* however, the engine is rated 154 hp. at 800. This is in line with the Buda policy of adapting an engine to the work to be done and rating it conservatively. Consequent long life may be expected of this power plant: special alloy castings give great strength at a minimum of weight; with the employment of a low BMEP and the Lanova-type combustion system, a soft combustion is effected with little detonation and strain on reciprocating parts. The appreciable reserve power in the propulsion unit simplifies engine-room machinery. No auxiliary generating plant is necessary, as an auxiliary generator for lighting and battery charging of 850 watts d.c., 32 v., is driven by the main Diesel. Fuel injection is American Bosch; cooling is closed-circuit; lube and fuel filters are built-in. A smart and handy installation on the vessel is the system of Bendix engine controls. The Diesel can be started, stopped, reversed, or accelerated from the pilot-house. One-man operation is an actuality; all controls are at the pilot's fingertips. Other ship's conveniences include the WebbperfectioN range in the galley, burning Diesel fuel and providing for the hot water supply, as well as handling the cooking. Masonite panelling supplies insulation in the superstructure.

New Pump Data Sheets

AS A SPECIAL war-time service to pump operators, Goulds Pumps, Inc., Seneca Falls, N. Y., has made available the company's "Pump Application Sheets," originally prepared for the confidential use of its own salesmen. These sheets, of two to eight pages each, include both elementary and advanced technical data on selection, installation, operation and maintenance of all types of industrial pumps for general and specialized services.

The sheets, with an eighteen page booklet, "Pump Fundamentals," are furnished, without charge, in a durable file folder containing an extra pocket for the recipient's own notes and hydraulic data. From six to fourteen sheets will be placed in each folder, depending upon the type of information deemed most useful to the recipient. Additional copies of individual sheets or of the complete folder will be furnished on request, without charge. Address Dept. 22 Goulds Pumps, Inc., Seneca Falls, N.Y.

It is expected that the more elementary shee will be of great assistance in training new, i experienced employees, while the more tec nical sheets should help operators get maximu performance from existing equipment, regar less of its manufacture.

Elliott Co. Appoints C. F. Harms Manager of Supercharger Sales

C. F. HARMS has been named manager of the Elliott Company supercharger sales department. He joined the company twenty years ago upon graduation from the University of Illinois. He has been a field engineer in the Chicago and Minneapolis offices, and joined the supercharger sales department in September.

Volume Seven of the Diesel Engine Catalog will come off the press on July 31. See pages 20 and 21.

GROWING importance of the Great Lakes region as a shipbuilding center has been further evidenced with the launching at Lorain, Ohio, on June 4 of the minesweeper *Sentinental*, whose motive power is Diesel-electric. This minesweeper is the fourth to be launched from the yard this spring and the 220 ft. craft was sponsored by Mrs. E. P. Farley, wife of the executive committee chairman of the American Shipbuilding Company.

West Coast Diesel News

THE Mack Manufacturing Corporation of Long Island City, N. Y., has concluded arrangements for the handling of its marine Diesel engines on the entire West Coast by the Atlas Imperial Diesel Engine Company, Oakland, California, according to announcement made by J. A. Stoner, vice-president of the Mack corporation.

MYLARK, 55-ft. halibut boat built by the Columbia Boat Building Co., Astoria, Oregon, for Huntington Marlarkey, Portland, is pow-

...ed with a 100 hp. Caterpillar marine Diesel with 2 to 1 Twin Disc reduction gear.

RECENT Mack marine Diesel installations include Model 605W's in the 70-ft. *Fearless* of the Coastal Towing Company, and 65-ft. *Port Arthur I* of the Shingle Bay Packing Company, both of British Columbia.

THREE months ahead of schedule, the launching of the U. S. YMS-117, only 71 days after laying keel, won for the Harbor Boat Building Co., Terminal Island, California, the coveted Navy E Flag. Main power is by Cooper-Bessemer, auxiliaries by Buda and General Motors, all Diesels.

FAIRBANKS-MORSE two cycle Diesels equipped with American Blower hydraulic couplings and Farrell Birmingham reduction gears, are installed in the 320-ft. seaplane tender *San Pablo* recently launched at Associated Shipyards, Seattle, Washington.

THE 68-ft. cannery tender recently launched by the Menchions' Shipyard, Vancouver, B. C., for the Sooke Harbor Packing Co. Ltd., is powered with a 135 hp. Atlas Imperial Diesel.

ALL Fairbanks-Morse powered, the 75-ft. tuna boat *Sunset* for Tony Bregante by Hollinger and Millican, San Diego, California, was completed in May. Main engine is 240 hp. at 400 rpm. Diesel; auxiliaries are 60 hp. Diesels, direct to 40 kw. generators. Pumps are also F-M and pyrometers are by Alnor.

G. M. GUILBERT, vice president and general sales manager of the Twin Disc Clutch Co., Racine, Wisconsin, was a recent Pacific Coast visitor. He conferred with Western representatives as far north as Seattle, Washington.

AFTER twenty years of service with a 100 hp. Fairbanks-Morse Diesel, the Puget Sound Navigation Company's ferry *Lake Constance* has been repowered with a 140 hp. direct reversible F-M Diesel and fitted with a new F-M 7 hp. auxiliary.

CONTE GRANDE, 135 ft. tuna clipper by Lynch Shipbuilding Co., San Diego, California, is powered with a 690 hp. at 300 rpm., 2-cycle Fairbanks-Morse Diesel with air-cooled pistons; auxiliaries are two F-M 240 hp. at 400 rpm. Diesels.

TWO of six all-steel welded 100 ft. towboats for the Maritime Commission were recently launched by the Birchfield Shipbuilding and

Boiler Co., Tacoma, Washington. They were the *Port Angeles* and *Port Discovery*, each powered with a 1,000 shp. Enterprise Diesel.

"MIKE" Rhine, industrial manager for General Electric in San Francisco for the past fifteen years, has been promoted to the position of manager of industrial, federal and marine departments, Pacific Division. He has been closely connected with the promotion of the Diesel-electric drive for ship propulsion.

COAST Fishing Co., Wilmington, California, have repowered its 75-ft. purse seiner *Progress* with a Fairbanks-Morse 2 cycle Diesel rating 240 hp. at 400 rpm.

GEORGE M. McKeen announces the repowering of the Standard Towing Co.'s 42-ft. tug *Standon* of Vancouver, B. C., with a new 6 cylinder 100 hp. Buda-Lanova Diesel after a complete overhaul of the vessel.

ANOTHER San Pedro fishing company to repower with a Fairbanks-Morse Diesel is the Southern California Fish Co. of Terminal Island, California. This is a two cycle engi of 240 hp. in the *City of Avalon*, seine bo

THE Maritime Shipyards, Seattle, Washingt are constructing eight 88-ft. power scows the U. S. Army Engineers. The beam is ft., with a draft of 10 ft., of the shovel-n type with twin Diesels.

THE Foss Launch and Tug Co., Tacom Washington, has repowered its tug *Rosed* with a 165 hp. Gray Diesel with reduction g and front end power takeoff.

SMITH, Emard Packing Company's canne tender of Anchorage, Alaska, formerly the 1 ft. S.C.155, has been repowered with two supe charged Cummins Diesels, making a total three engines and all having 3 to 1 Twin Di gears.

VAN Camp Seafood Co., Terminal Islan California, has repowered its fishing boat *Pr perity* with a new two cycle, 6 cylinder 180 h at 450 rpm. Fairbanks-Morse Diesel.

THE all-welded steel 52-ft. tug for constru tion service on San Francisco Bay has be completed by the Reliable Welding Work Olympia, Washington. Her power is twin 1 hp. Gray Diesels with reduction gears.

FOSS Launch and Tug Co., Tacoma, Was ington, has installed a Waukesha-Hesselm multi-fuel engine in its tug *Rival*. This is 7" by 8½", 6 cylinder 215 hp. power plant a the second to be purchased by the Foss co pany.

THE Fraser River, B. C. 38-ft. tunnel sce tug *Riverview* by Goddard Shipyard for Keech is powered with 60 hp. Fairbanks-Mor Diesel with 2 to 1 reduction gear.

THE Puget Sound Tug and Barge Compan of Seattle, Washington, recently acquired t tug *Frank B* and is installing a new At Imperial Diesel. A new 160 hp. Murphy Die went into its tug, *Delwood* recently.

WITH the growing threat of gasoline sho age in the Northwest, the popularity of t small marine Diesel is increasing. One of t latest to install is Warnock and Sons of Irving Landing, B. C., with a Fairbanks-Morse 3 cyl der 30 hp. in the fishing boat *Kerry Jr.*

Hans Bohuslav Joins Sterling

MR. Addison F. Vars, President, recently a nounced that Mr. Hans Bohuslav has join

he Sterling Engine Company as Vice President n charge of Engineering. In making the an- ouncement Mr. Vars stated that the acquisi- ion of Mr. Bohuslav is another step in terling's all out program in producing engines r the Navy. "Mr. Bohuslav's invaluable ex- erience is a priceless asset in the battle for roduction," said Mr. Vars.

Hans Bohuslav

Before coming to the Sterling Engine Com- any, Mr. Bohuslav was associated with the Enterprise Engineering Company of San Fran- isco. During his ten years' stay, he served first Chief Engineer and was later promoted to Vice President in charge of Engineering. He s known throughout the engineering industry s an authority on Diesel and gas engines, and irected the development of the current Enter- rise Diesel engines.

He also served on the West Coast as consultant or various concerns. His acknowledged skill nd experience was in frequent demand. Among the companies he served are the Beth- hem Shipbuilding Corporation, General Engi- eering Corporation, General Petroleum Com- any, and Pacific Gear and Tool Company. rom time to time his consultant work in- luded special assignments from the War De- artment's U. S. Corps of Engineers.

iesel Engine Corporation nnounces Change in Name

THE Rogers Diesel & Aircraft Corporation re- ently became the new corporate name of The ummins Diesel Engine Corporation of New ork. The corporation operates two New York lants, 1120 Leggett Ave. and 724 Garrison ve., with offices situated at the former address. riginally formed in 1934 as a distributing organization for Cummins Diesel engines, the corporation has since enlarged its scope of operations and its facilities to the point where a new corporate name was needed to describe more adequately the nature of its business.

Although continuing as a distributor for Cummins engines, Rogers Diesel & Aircraft Corporation now represents Enterprise and Sheppard Diesel engines, also, and, in addition, manufactures a complete line of gasoline and Diesel-driven generator sets and power and pumping units.

In announcing the adoption of the new name, Ralph B. Rogers, president of the corporation, said that, "The new corporate name does not mean that any reorganization or change of ownership has taken place. Management, products, and policies are in no way affected."

In addition to its two New York plants, Rogers Diesel & Aircraft Corporation is engaged in manufacturing activities in two other states. In 1940, it purchased the Edwards Company of Sanford, N. C., manufacturers of railway motor cars and aircraft equipment, and a year later

—through the Edwards Company—acquired control of the Hill Diesel Engine Company of Lansing, Mich., one of the country's well-known engine builders for over forty years. While these two subsidiary companies retain their respective company names, they will now be further identified as divisions of Rogers Diesel & Aircraft Corporation. Executive offices of all the companies are located at the new Leggett Avenue plant in New York. All of the companies are known to be working full capacity in the production of vital war material.

Important "OEM" Handbook

AN "OEM Handbook," describing the functions and organization of the war agencies within the Office for Emergency Management, has been issued.

The 72-page booklet describes in detail the organization of the War Production Board, The Office of Price Administration and the other constituent agencies of the OEM. Personnel is listed in most cases down to the branch level in each agency. Included are organization charts of the WPB and the Bureau of Industry Branches of the WPB Division of Industry Operations, as well as a chart showing the relationship of the various Federal war agencies.

Copies of the booklet are available in room 1501, New Social Security Building and from the Superintendent of Documents, Washington, D. C., and at OEM field offices.

See pages twenty and twenty-one for details of the latest and best book on Diesel Engines.

British Merchant Navy Men Study Diesels and Await New Ships

FIFTEEN members of the British Merchant Navy have taken up temporary residence at Grove City, Pennsylvania, where they are studying American marine Diesel engines at the plant of the Cooper-Bessemer Corporation. Fourteen members of this group have been forced to abandon their ships somewhere on the dangerous sealanes. W. R. Watson, senior officer in charge of these men, is the only member of the group who has not lost his ship.

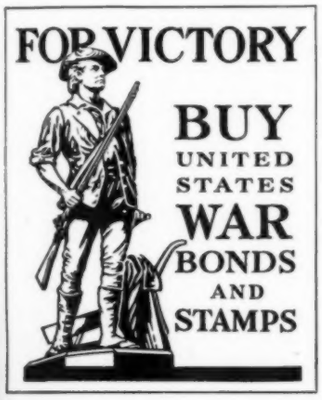
Numbering engineers first class, engineers second class, and chief electricians, this group of British Merchant Navy men are studying American Diesel engines at the Cooper-Bessemer Corporation's factories in Pennsylvania, awaiting re-call to active sea-duty.

Eventually, these men will be assigned positions aboard ships now building in this country. Naturally, those vessels will be equipped with American Diesels for both their main and auxiliary power, and it is for this reason that the group is undertaking an intensive course in the study of those engines.

Exemplified by the efforts of this group is the British rule to make every minute count. Studying the construction, operation and maintenance of Cooper-Bessemer Diesels, while marking time until orders are received sending them again to sea, these men are making sure that the intricacies of the engines of their ships will be an open book when that day arrives.

New Handbook on Care of Motors

WITH motors operating 168 hours a week instead of 40 hours as formerly, most books on motor care are now seriously out-of-date. To correct this situation, Allis-Chalmers, Milwaukee, Wisconsin, has just published a new handbook entitled "A Guide to Wartime Care of Electric Motors." Taking a fresh, new slant at the subject of motor care under war conditions, the book is of great value to war plant engineers and maintenance men, and is of particular value for training new men. The book contains no advertising, and is available upon request.



H. K. Porter Co. Will Open New Plant

T. M. EVANS, president, H. K. Porter Co., Pittsburgh, has announced that the Porter Company plans to open a plant in Blairsville, Pa., expanding their facilities in the war effort. The company's regular products include locomotives and a complete line of chemical processing equipment. It is anticipated that when the plant is in full operation, between 150 and 200 men will be employed.

Reserve YOUR copy of the new Diesel Engine Catalog. Use the convenient coupon on page twenty-one.

Twin Disc Moves Hydraulic Division

NEW machines and new facilities are now being installed in the Twin Disc Clutch Company's plant at 1310 Preston Street, Rockford, Illinois, and a considerable increase in the number of employees will take place very shortly, it has been announced. The expansion results from the creation of a separate division of the Twin Disc Clutch Company to handle the development, production and sale of Hydraulic Drives and Torque Converters, formerly a department of the company's operations at Racine, Wisconsin.

Mr. R. M. Schaefer has been named vice-president in charge of the Hydraulic Division of the Twin Disc Clutch Company, all of the activities of which now will be concentrated in Rockford. The products to be manufactured involve fluid-type transmissions, which are finding ever-increasing applications in many industrial fields. This development has been carried on extensively by the Twin Disc Clutch Company for the last five years. Further engineering research and development will be carried on by the staff of Twin Disc engineers recently transferred from the Racine plant to the laboratories now made available in the Rockford plant.

As with most industrial concerns today, practically all of the work of the Twin Disc Clutch Company is concerned with war production, and the new arrangement will speed up deliveries, both of Hydraulic Equipment and the other products manufactured in Racine. In view of the increasing importance of Hydraulic Drives, a relatively new item, it is anticipated

that peace time needs will continue to demand all the production facilities now being established in Rockford.

Mr. P. H. Batten, one of the men who originally organized the Twin Disc Clutch Company in 1918, is extremely active as the President of the Company in Racine, Wisconsin. Assisting Mr. Schaefer in Rockford will be Mr. R. P. Exten, Plant Manager, Mr. J. R. Murphy, Purchasing Agent, and Mr. R. T. Rehwald, Assistant Secretary of the Company.

Navy "E" Privilege Renewed To American Locomotive

RENEWAL of the privilege to fly the Navy E pennant for achievements in the production of Naval ordnance has been granted the American Locomotive Company, according to an announcement by Duncan W. Fraser, president.

The company was first cited for the Navy's industrial incentive award October 24, 1941. The flag has been flying over the company's Schenectady, N. Y., plant since November 18.

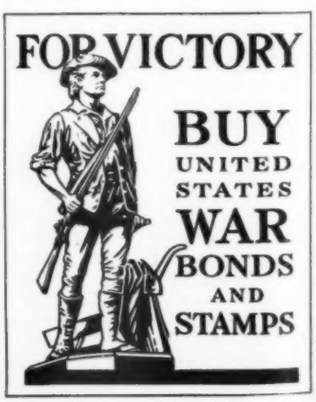
In reporting the Navy's renewal of the citation Rear Admiral H. A. Wiley, chairman of the Navy Board for Production Awards, said in a letter to Mr. Fraser: "A Navy E is not lightly bestowed in the first instance; the requirements for renewal are equally exacting. In being selected for the honor a second time, you have demonstrated that yours is no half-hearted, 'flash-in-the-pan' effort, but rather a solid determination to supply the Navy with the materials it must have to carry the engagement to the enemy. That's the spirit that has made the nation what it is today. It is the spirit that will win this war."

By the Navy's action American Locomotive is given the right to fly the pennant for an additional six-months' period, dating from April 2[illegible]

Write For This

A NEW eight page illustrated publication "On Land and On Sea" published by the Honan-Crane Corporation of Lebanon, Indiana, to show installations and data on how Oil Purification is being used in Modern Industry. Contents cover Diesel Engines, Turbines, Hydro Electric Generators, and a wide range of Industrial uses such as Hydraulic Presses, Transformers, Cutting and Grinding Machines and many others.

Write Honan-Crane Corporation, 200 Superior Street, Lebanon, Indiana, for a copy of the current issue.

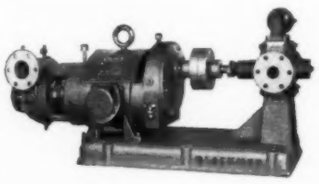


New Dual-Purpose Blackmer Pumping Unit

A COMBINATION rotary-centrifugal dual pumping unit has been added to the Blackmer line of pumps, according to an announcement by J. B. Trotman, General Sales Manager of the Blackmer Pump Company.

The new unit is mounted on a cast bedplate and is powered by a 4 hp., 3 phase 60 cycle motor with a gearhead on one end to drive

rotary pumping unit, and a shaft extension on the other end, connected direct to a centrifugal pump. The rotary pump has a capacity of 44 gpm. at 50 psi., handling lube or fuel oil. The



centrifugal pump has a capacity of 75 gpm. at 25 psi. handling water.

In marine and other applications, where pumping facilities for both lube or fuel oil and water are required, these new Blackmer units offer obvious advantages. They are currently being used in connection with the war effort on marine craft and in industrial plants on applications where two dissimilar liquids must be handled through one pumping unit.

For information and detailed specifications concerning the new pump, write J. B. Trotman, Blackmer Pump Company, Grand Rapids, Michigan.

Marine Engineers, Architects, and Allied Naval Officers See Diesels in the Making

AS a part of the two-day Spring meeting of the Society of Naval Architects and Marine Engineers, held at Pittsburgh on May 26 and 27, many of those attending visited the Pennsylvania plant of The Cooper-Bessemer Corporation. As guests of the engine builders, the purpose of their visit was to see just what goes into the making of the marine Diesel engines which that company is producing in greater quantities than ever before for Coast Guard,

Maritime Commission, and U. S. Navy vessels. Transported by bus and automobiles from their headquarters in Pittsburgh, to the Penn-Grove Hotel in Grove City, forty-some visitors and twenty company representatives were served luncheon in the ball room and addressed briefly by B. B. Williams, president, and Gordon Lefebvre, General Manager, of The Cooper-Bessemer Corporation. They were then conducted on a tour of the company's foundries, machine shops, assembly floors, and test departments. Seven different sizes and types of engines were on test at the time and afforded the visitors an excellent opportunity to see those engines operating at various loads and speeds. Precision machines and methods of manufacture came in for much attention by the group. Scheduled for two hours, the tour, and refreshments which followed, stretched out to nearly three, after which the visitors were transported back to the William Penn Hotel in Pittsburgh.

Among the ranking naval officers, engineers, and architects present were Captain P. B. Eaton and Lt. Comndr. E. M. Kent of the U. S. Coast Guard; Lt. Comndr. F. B. Hays, Lt. R. J. Sumner, and H. B. Gregory of the U. S. Navy, Bureau of Ships; Comndr. W. F. Jamison of the British Royal Navy and British Embassy and W. R. Watson of the British Merchant Navy; Hugo Haas, naval architect from the office of the Quartermaster-General-War Department; John H. Wells and T. R. Tarn, well-known naval architects, Daniel J. Brown and James Young of Pusey and Jones, shipbuilders; and Prof. H. L. Seward of Yale University.

Your name will be imprinted on the front cover of the new Diesel Engine Catalog without charge if your order reaches us before July 31—see pages 20 and 21.

A. E. Donker, Eastern Manager for Honan-Crane

HONAN-CRANE Corporation of Lebanon, Indiana, has opened a Branch Office in New York City that will have supervision over the entire eastern states and handle all export business. A. E. Donker who has been in charge of the Washington Office has been made Eastern Manager and has moved to New York to take over this Branch Office which will be located at 30 Church Street.

Continental Equipment Company headed by M. W. Brooks will continue to represent Honan-Crane Corporation in New York City. The Washington Office at 508 Bowen Building will be in charge of M. Parker Nolan.

A. E. Donker

Honan-Crane Corporation is a manufacturer of Oil Purification Equipment for Diesel Engines, Steam Turbine, and Hydro Electric Generators and a wide range of Industrial applications such as Hydraulic Presses, Transformers, Cutting and Grinding Machines, Compressors, etc.

Diesel Tractors Do the Strangest Things

CATERPILLAR Tractor Co., Peoria, Illinois, has just completed moving, intact, a hùge brick and steel incinerator some 300 feet.

The incinerator, 64 feet high, 14 feet in diameter, and weighing over 100 tons, was moved to make room for the installation of new equipment designed for the salvage of steel chips and turnings.

A Caterpillar Diesel D4 Tractor, with the aid of a cable and pulley blocks, handled the moving job without trouble. The incinerator, cribbed up on steel beams which rested on round steel bars, was towed to its new location. Approximately fifty tons of firebrick, which line the lower part of the stack, were not removed. The brick served as ballast against the wind and saved a relining job.

While incinerators play a minor role in factory housekeeping work in these days of high-geared salvage work, they are still necessary for destroying hazardous waste, with absolutely no salvage value.

Five dollars buys the new edition of the Diesel Engine Catalog which will be ready to mail on July 31.

Wm. A. Roever of Clark Bros. Co. Enters Coast Artillery Service

WILLIAM A. Roever, sales engineer since 1937 for Clark Bros. Co., Inc., manufacturers of Diesel and gas engines, and compressors, first at the Dallas and later at the Houston branch office, has recently been called to military service at Camp Wallace, Texas. Entering service as a member of A Battery, 31st Artillery Training Battalion, he has held the rank of Adjutant on the Battalion Staff since April 15.

Lieut. Roever's background of engineering and his previous years in artillery service have constituted an ideal preparation for his present work.

Reserve YOUR copy of the new Diesel Engine Catalog. Use the convenient coupon on page twenty-one.

Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

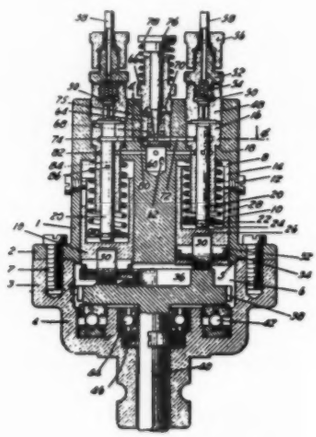
Conducted by C. CALVERT HINES*

21,966
FUEL INJECTION PUMP

Everett M. Purdy, Brooklyn, N. Y. assignor to Eisemann Magneto Corporation, New York, N. Y., a corporation of New York.

Original No. 2,166,876, dated July 18, 1939. Serial No. 48,744, November 7, 1935. Application for reissue March 20, 1941. Serial No. 384,425.

7 Claims. (Cl. 103—41)



1. A fuel injection pump for internal combustion engines comprising a sectional casing having a plurality of plunger bores uniformly spaced in a circle about an axis of said casing and a sectional bushing in said casing forming a cylindrical valve chamber disposed on said axis of said casing and triangular ports at the meeting surfaces of said bushing sections connecting said valve chamber to said bores, pump plungers in said bores for forcing fuel from said bores to the cylinders of an engine, means for operating said plungers, means for venting fuel from the plunger bores to said ports for cutting off the flow of fuel from said plunger bores to the engine cylinders at a fixed point in the movement of said plungers and a cylindrical control valve in said valve chamber having a flat end controlling said ports to govern the amount of fuel supplied to the pump plunger bores.

2,262,151
FUEL CONTROL SYSTEM FOR DIESEL ENGINES

Warner T. Tabb, Brooklyn, N. Y., assignor to Eisemann Magneto Corporation, Brooklyn, N. Y., a corporation of New York.

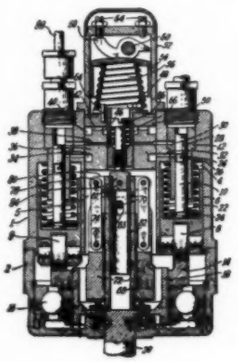
Continuation of application Serial No. 66,711, March 2, 1936. This application February 12, 1941, Serial No. 378,505

3 Claims. (Cl. 123—140)

1. In a fuel control system for a Diesel engine or the like which has nozzles for injecting fuel into the engine cylinders, the combination with a pump provided with plungers for forcing fuel cyclically to said nozzles, said pump having a

* Patent Attorney, 811 E. Street, N.W., Washington, D. C.

casing provided with an axial bore and a plurality of circumferentially disposed plunger bores and with sets of passages establishing communication between said axial bore and said plunger bores whereby ingress and egress of fuel to the latter are afforded, of a valve member



slidably disposed in the axial bore of such pump casing and provided with passage means controlling a selected set of fuel passages in the pump casing, said passage means being formed to balance any axial forces arising from the pressure of fuel passing therein, spring means for biasing said valve member in a desired position, a centrifugal governing unit disposed in said axial bore having its axis in line with said valve member and arranged to react against the pressure of said spring means for operating said valve member, and rotatable means associated with the pump casing provided with an engine driven shaft and mechanically coupled for actuating said governing unit.

2,266,776

DIESEL FUEL

Leonard N. Leum, Lansdowne, Pa., assignor to The Atlantic Refining Company, Philadelphia, Pa., a corporation of Pennsylvania.

No Drawing. Application September 24, 1938, Serial No. 231,595

5 Claims. (Cl. 44—9)

1. A compression ignition fuel comprising fuel oil having an initial boiling point of at least 300° F. and an organic borine-amine addition compound in quantity sufficient to substantially increase the cetane number of said fuel oil, the structure of said borine compound being such that the boron atom thereof is directly attached to a carbon atom only singly bonded to other atoms.

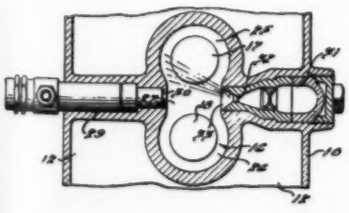
2,267,418

FUEL INJECTION TYPE ENGINE

Sidney Oldberg, Birmingham, and Paul M. Nash, Detroit, Mich., assignors to Chrysler Corporation, Highland Park, Mich., a corporation of Delaware.

Application February 3, 1940, Serial No. 317,100

4 Claims. (Cl. 123—32)

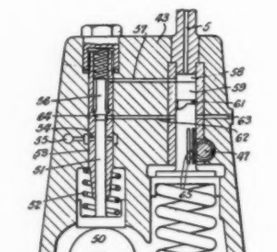


4. In an injection engine, a cylinder and a piston operating therein, a substantially 8-shaped combustion chamber overlying and opening into the cylinder, said combustion chamber being defined by a pair of lobes connected by opposed cusps, an energy cell opening into the combustion chamber at one cusp there-

See pages twenty and twenty-one for details of the latest and best book on Diesel Engines.

of in which air may be mixed with fuel and compressed to initiate combustion by the heat of compression, and an injection nozzle opening into the combustion chamber at the other cusp thereof for facilitating the injection of fuel into said energy cell, said energy cell having a throat including a tubular passage, the axis of which is inclined toward a lobe of said combustion chamber for directing a relatively dense, confined stream of ignited fuel mixture and products of combustion from the energy cell against a curved portion of said lobe adjacent to said injection nozzle, said curved portion sloping outwardly away from said injection nozzle so as to initiate flow of said ignited fuel mixture and products of combustion in an 8-shaped path in a direction away from said injection nozzle and through the lobes of said combustion chamber.

2,265,692
FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES
George Stephen Kammer, High Austby, Middleton, near Ilkley, England.
Application June 5, 1940, Serial No. 338,998
In Germany March 10, 1939
5 Claims. (Cl. 103—41)

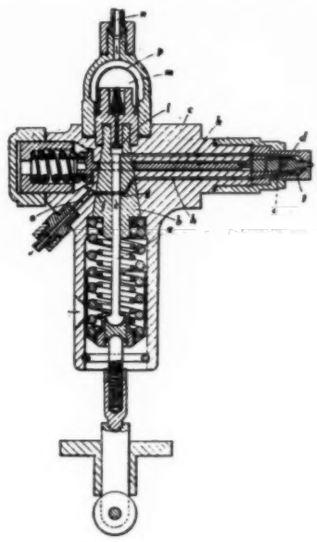


1. In a fuel injection arrangement for an internal combustion engine, a charging pump having suction and delivery spaces, a hydraulic accumulator constituted by a plunger movable axially in a pressure space and rotatable on its axis and resilient means pressing on the plunger, a feed connection including a non-return valve between the pump deliver space and the accumulator pressure space, an oblique edged groove on the accumulator plunger being located to establish connection between the delivery and suction spaces of the pump when the resilient means has been compressed by a predetermined amount, and means for rotating the plunger to vary the pressure at which the groove establishes the said connection.

2,260,077
FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES
Arthur Richie Kearney, Westminster, London, England.
Application May 3, 1939, Serial No. 271,586
In Great Britain May 17, 1938
2 Claims. (Cl. 299—107.2)

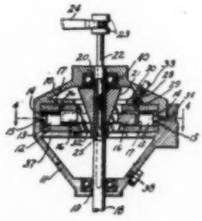
1. Fuel injection means comprising a casing having a pump including a barrel and an injector including a valve, a plunger slidably mounted in the barrel, said barrel having a compression space for cooperation with one end of the plunger and said plunger having an annular groove spaced from said end thereof, said injector having a fuel supply line leading there-

to from said compression space and further having a fuel return line leading therefrom to the peripheral face of the plunger, said return line being in communication with said annular groove when the pump ends its compression stroke, said casing further having a



low pressure space adapted to receive fuel from a source of supply and having an outlet passage leading to said compression space, and a non-return valve controlling said outlet passage, said barrel further having an outlet port so located as to register with the annular groove when the latter is in communication with said fuel return line and adapted to return fuel discharged therethrough to said source of supply whereby provision is made for conducting fuel through the injector in a one-way open circuit at low pressure following the compression stroke of the pump to carry off any air trapped in said fuel lines.

2,262,181
DIESEL ENGINE INJECTOR
Monte E. Hover, Culver City, Calif., assignor of one-half to Robert W. Fulwider, Los Angeles, Calif.
Application September 16, 1938, Serial No. 230,275
18 Claims. (Cl. 123—138)



1. A fuel injector for internal combustion engines which includes: a housing; a rotor mounted on a shaft within said housing and provided with a generally radially disposed cylinder and a free piston therein; means for limiting the inward travel of said piston within said cylinder; means for injecting fuel under pressure into said cylinder; and means for forcibly ejecting said fuel from said cylinder.

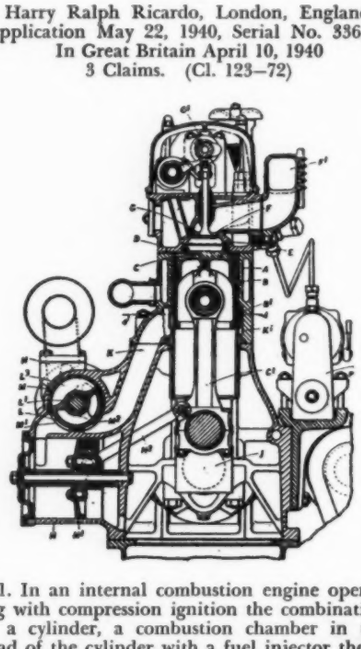
Volume Seven of the Diesel Engine Catalog will come off the press on July 31. See pages 20 and 21.

2,259,660

TWO CYCLE INTERNAL COMBUSTION ENGINE

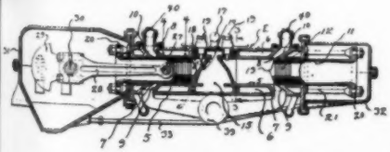
Harry Ralph Ricardo, London, England.

Application May 22, 1940, Serial No. 336,669
In Great Britain April 10, 1940
3 Claims. (Cl. 123—72)



1. In an internal combustion engine operating with compression ignition the combination of a cylinder, a combustion chamber in the head of the cylinder with a fuel injector therein into which chamber substantially the whole of the air charge is forced at the end of the compression stroke by the piston in the cylinder, an exhaust port centrally situated in the inner wall of the said combustion chamber with a poppet valve seated in this port the valve seat in this port being set in a cylindrical recess and the valve having a corresponding cylindrical part, an air pump comprising a cylinder and a piston reciprocated therein directly from the engine crankshaft, the pump cylinder being mounted on the crankshaft casing with the axis of that cylinder substantially at right angles to the axis of the working cylinder and of the crankshaft, air inlet ports in the wall of the working cylinder and controlled by the piston therein, a transfer passage between the pump cylinder and said air inlet ports with a valve in this passage adjacent to the pump cylinder, and mechanism operated by the engine crankshaft and actuating said exhaust valve and said valve in the transfer passage in timed relation with the working piston and the pump piston as set forth.

2,257,372
TWO-CYCLE DIESEL ENGINE
James A. Eaton, Birmingham, Mich., assignor to Francie Eaton, Birmingham, Mich.
Application April 20, 1939, Serial No. 268,897
1 Claim. (Cl. 123—57)



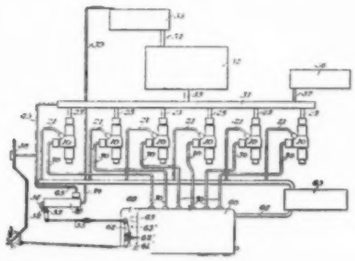
In a Diesel two-cycle engine, a unit comprising, a pair of longitudinally alined cylinders, a cylinder head connecting said cylinders and occupying the space therebetween, each having an offset chamber, a fuel injector nozzle arranged in each chamber, pistons reciprocally mounted in the cylinders, means operatively connecting the pistons together, a crank-shaft, connecting rods operatively connecting the crank-shaft to certain of the pistons, V-shaped extensions formed on the inner ends of the pistons adapted to ride into the cylinder head, each of the cylinders having diametrically opposite inclined inlet and outlet ports arranged intermediate their ends leading toward the cylinder heads adapted to be covered and uncovered by the pistons, a blower communicating with the inlet ports, and an exhaust manifold communicating with the outlet ports, said ports having inclined ways extending toward the cylinder heads, the inclined sides of the V-shaped piston extensions inclining toward said inclined inlet and outlet ports.

Five dollars buys the new edition of the Diesel Engine Catalog which will be ready to mail on July 31.

2,258,297
ORGANO-METALLIC DIESEL FUEL IGNITION PROMOTERS
Pharis Miller, Des Moines, Iowa, and Gould H. Cloud, Elizabeth, N. J., assignors to Standard Oil Development Company, a corporation of Delaware.
No Drawing. Application July 23, 1938, Serial No. 221,015
3 Claims. (Cl. 44—9)

1. The method of operating compression ignition engines of the high speed Diesel type which comprises injecting into the combustion zone of the engine a hydrocarbon Diesel fuel and shortening the ignition lag of said fuel by having present therewith an organo-metallic compound containing a metallic constituent selected from the class consisting of mercury and antimony directly linked to carbon atoms in alkyl radicals, said organo-metallic compounds being present in an amount sufficient to decrease the ignition lag of the fuel.

2,265,534
INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES
William Cleveland Lloyd, Detroit, and Henry William Stihler, Jr., Rasinville, Mich.; said Lloyd assignor to Bertha Shaughnessy, Corpus Christi, Tex.
Application July 29, 1938, Serial No. 221,984
14 Claims. (Cl. 123—140)



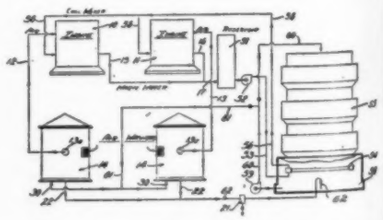
5. A fuel injection system for internal combustion engines comprising the combination of an injection nozzle, a fluid pressure-operated valve in the nozzle and having a face against which pressure acts to close the valve and a second face on which pressure may be imposed to open the valve, two sources of independent fluids under pressure, means for constantly imposing fluid continuously under pressure from one of said sources on the first mentioned face means for periodically imposing pressure impulses from the other source on the second mentioned face sufficient to open the valve against the influence of the pressure imposed on the first mentioned face, and means responsive to the speed of the engine for varying the pressure of the fluid effective to close the valve to regulate the pressure required to open the valve.

2,257,184
PISTON
Adolph L. Nelson, Detroit, Mich., assignor to Bohn Aluminum & Brass Corporation, Detroit, Mich., a corporation of Michigan.
Application May 7, 1936, Serial No. 78,348
10 Claims. (Cl. 309—14)

1. In a piston of the type formed of a light weight piston material and having piston pin bosses, a piston pin of material having a lower coefficient of expansion than the piston material passing through the pin bosses and having a tight fit in the bosses at 70° F., a skirt having opposite thrust faces, the outer surface of the skirt being at 70° F. of oval shape with the major axis of the oval coinciding with the thrust diameter, the piston being adapted to operate in a cast-iron cylinder bore, the improvement which comprises in combination with the above; a pair of bimetallic elements extending chordally of the piston at right angles to the axis of the piston pin, each bimetallic element comprising an inner primary member of material less expansible than the skirt material extending from one thrust face to the other, and an outer primary member of the skirt material, the bimetallic elements acting to bend the thrust faces toward cylindrical shape upon an increase of temperature, one of the thrust faces being formed with a vertical slot, the parts being so disposed that when upon cooling from an elevated temperature the pin bosses seize on the piston pin further cooling causes the bimetallic elements to move the parts of the skirt adjacent the slot outwardly on the thrust diameter thus keeping the thrust diameter at a close non-slapping fit in the cylinder bore.

2,258,088
SYSTEM FOR CONDITIONING AIR FOR ENGINES
William E. Dunn, Kansas City, Mo., assignor to The Fluor Corporation, Ltd., Los Angeles, Calif., a corporation of California.
Application June 15, 1940, Serial No. 340,723
9 Claims. (Cl. 123—174)

6. The method of conditioning air and cooling jacket water for engine operation, that includes drawing a stream of air through a washing zone to the engine by the engine suction, discharging warm jacket water from the engine into a reservoir, discharging a portion of the reservoir water into said washing zone in intimate contact with the air stream therein by spraying the water into the air stream, thereby



cooling said water and washing the air, returning cooled water from said washing zone to said reservoir, passing water from the reservoir downwardly within a cooling tower in contact with air passing therethrough, and then returning the cooled waters to the engine.

DIESEL PROGRESS

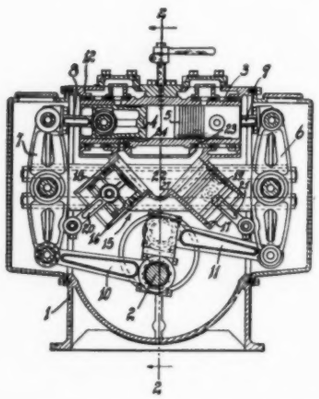
2,262,264

INTERNAL COMBUSTION ENGINE

Amos I. Addison, Long Beach, Howard B. Cheshire, Wilmington and Leroy E. Caverly, Long Beach, Calif.

Application July 10, 1939, Serial No. 283,606

5 Claims. (Cl. 123—51)



3. In combination with an engine, including a frame, a horizontal power cylinder, a pair of opposed pistons in the cylinder, a pair of rocker arms journaled in the frame, and drive means extending from the pistons to the rocker arms, of an opposed piston air compresser arranged immediately adjacent the power cylinder, said compressor being integrally formed with the water jacket of the power cylinder, said compresser including a pair of cylinders, said cylinders being arranged at an acute angle to the power cylinder, a piston in each cylinder, a compression chamber common to both cylinders, said compression chamber being substantially prismatic in shape, said air compressor having a pair of scavenging ports extending from the common compression chamber directly into the power cylinder, and a driving link connecting each of the pistons in the air compresser to a rocker arm, whereby the pistons in the compresser are reciprocated, and compression pressure adjusting blocks removably mounted in the compression chamber.

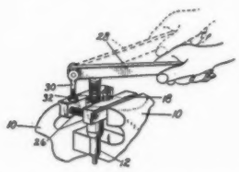
2,263,803

DIESEL INJECTOR POPPING TOOL

George M. Graham, Detroit, Mich., assignor to Hinckley-Myers Company, Jackson, Mich., a corporation of Michigan.

Application July 3, 1940, Serial No. 343,907

2 Claims. (Cl. 73—51)



1. A Diesel injector popping tool comprising a pair of complementary clamping jaws having opposed portions of their inner faces intermediate the ends of the jaws shaped to grip a Diesel injector body therebetween, a pair of guide pins fixed to opposite ends of one jaw and extending through pin apertures in the complementary jaw connecting said jaws together, said complementary jaw being slidable toward and away from the fixed jaw, said complementary jaw being recessed about each pin to a distance substantially greater than the thickness of the head of the pin, each pin having a head seated within said recess, an expansion spring encircling each pin between said jaws resistingly holding the jaws apart, handle mechanism swivelled to one jaw between its pin connection and its shaped face portion to be swung to a position overlying the opening between the shaped face portion of said jaws or to a position not overlying said opening, said handle pivotally supporting to be raised above or lowered toward said opening.

2,261,670

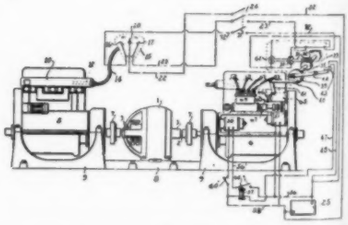
CONTROL MEANS FOR INTERNAL COMBUSTION ENGINES

George B. Bailey, Sharon, Mass., assignor to Thermal Engineering Company, Boston, Mass., a corporation of Massachusetts.

Original application April 8, 1935, Serial No. 15,166, now Patent No. 2,142,102, dated January 3, 1939. Divided and this application December 30, 1938, Serial No. 248,365

8 Claims. (Cl. 60—97)

1. A power installation comprising two or more power units of the internal combustion type, means interconnecting said units for supplying power therefrom to a common load, and means operable in accordance with variations in temperature of the products of combustion



from one or more of said units for changing the power delivery components of one or more of the remaining units.